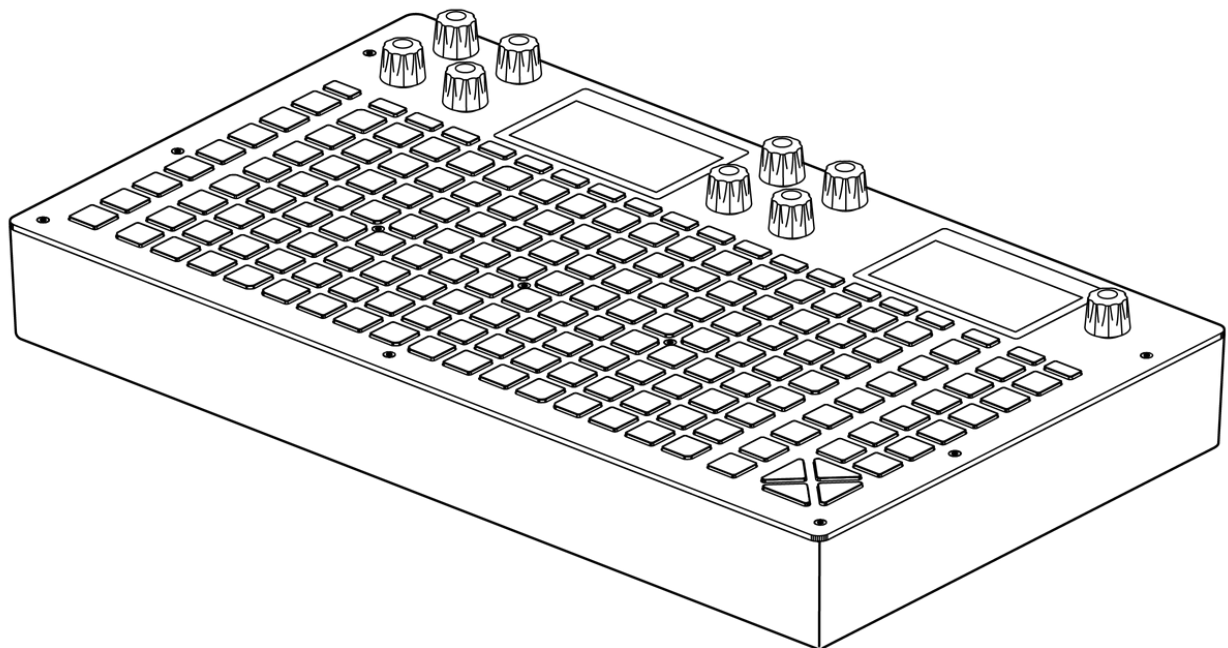


# **HAPAX** MANUAL

Professional dual-project sequencer.

32 tracks, 8 effects per track – MPE compatible –  
Advanced piano-roll and automation editing –  
High recording resolution – Phasing capabilities –  
Isomorphic keyboard & chord generator –  
Algorithmic tools – Undo/redo with history –  
Independent patterns arrangement mode with chaining –  
Dual-project transparent loading & playback for song mixing –  
Massive midi connectivity + Cv/gate.

engineered by Squarp instruments



## **Found a typo? Is something confusing, or wrong?**

Please contact us at [squarp.net/contact](https://squarp.net/contact)



Please consider the environment before printing this document.

This manual was updated on December 7, 2023.

Latest firmware at the time of writing: hapaxOS 2.00 beta A, released on December 7, 2023

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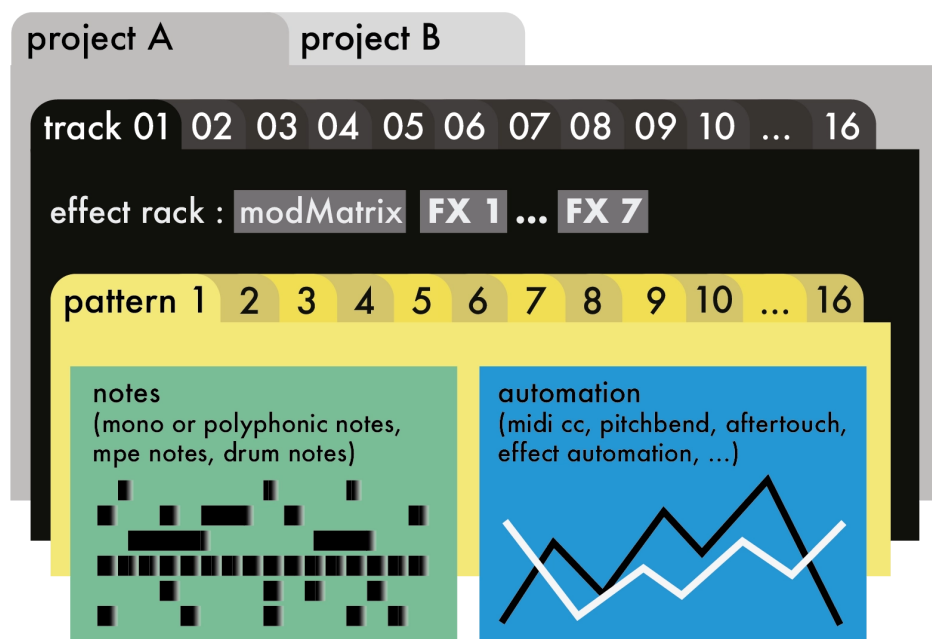
# 1. Basics

## 1.1. Power on

Plug the provided 15V power supply unit and **Press** the ON/OFF switch.

Hapax will quickly boot and be ready to use.

## 1.2. Sequencer workflow



## Projects

Hapax can load and play two projects simultaneously: proA and proB. Each project has 16 tracks.

## Tracks

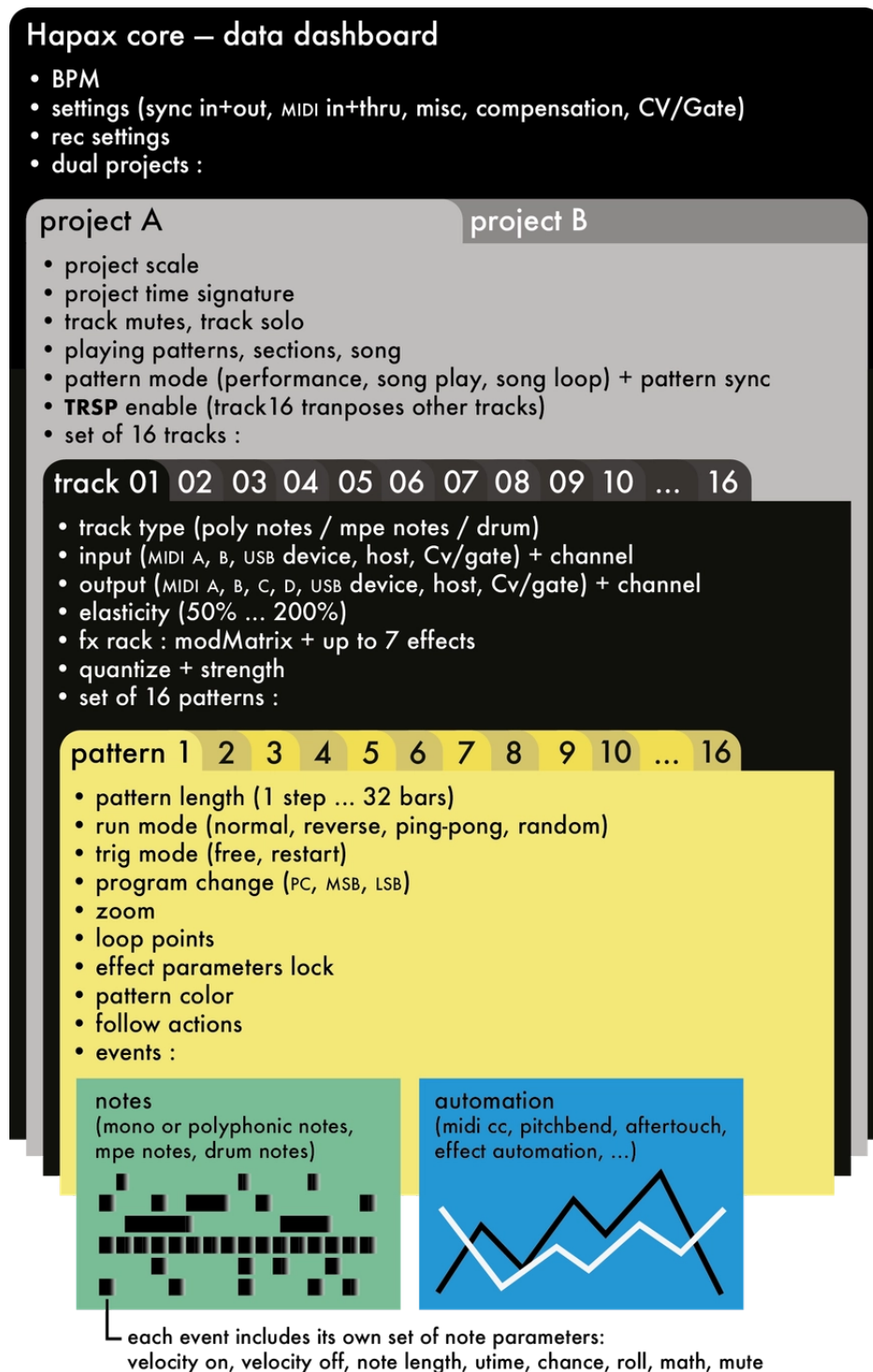
Each track has its own inputs & outputs, its own FX rack and a set of 16 patterns.

## Patterns

A pattern is a loop that contains polyphonic or monophonic notes and/or automation. Each pattern has its own events, length, runmode, effect parameter

values, ...

## 1.3. Memo: core architecture



## 1.4. Connecting a synthesizer: configure track input & output




Connect a MIDI or USB cable between the input of your favorite hardware synth and one of Hapax's output.

Hold a **track** to enter Track settings menu and select the output port and the output channel:



## TRACK OUTPUT



Every note of the track, whether coming from the built-in live matrix pads , the step sequencer or an external keyboard, will be sent on this output **PORT** and **CHANNEL**.

## TRACK INPUT

Input **PORT**: sets up which port the track is listening to.



Input **CHANNEL**: sets up which channel the track is listening to, depending on the chosen port:


- -- : the track isn't receiving notes from any port.
- **ALL ACTIVE**: the track listens to all input ports, only when this track is active.
- **MIDI A, MIDI B, USB DEVICE, USB HOST, CV/GATE** : the track only listens to the selected port. This setting is always active, even when the track is not selected.

Press **step**, enter some steps in the piano roll , then Press play  : your synth is now playing a sequence.

Or Press **live**, then play with the 128-pad matrix .

## 1.5. Play/stop

From stop state, pressing  will start the project playback. If you are in a playing state, pressing  will restart all tracks from the beginning.

- One press on  stops and resets the playback, and disable the recording. It will also send default automation midi values.
- A second press will send a midi "All Note Off" message to your instruments.
- A third press will send a midi "All Sound Off" message to instantly silence midi synthesizers.
- A fourth press will send all patterns midi Program Changes, if configured.

 From play state, when you are in **step** or **automation** mode, pressing  will restart all tracks to the current page position. From stop state, pressing **2ND** +  will restart all tracks to the current page position.

## 1.6. Working with projects, save & load

Projects proA and proB are accessible directly through their dedicated button. Each of them contains 16 tracks and can be played at the same time.

For smooth transitions you can seamlessly load a project on proB while proA is running for never ending live sets!

Press **proA** or **proB** to select a project.

Hold **proA** or **proB** to enter project settings:



On the right screen, you will also find the save/load menu:



## 1.7. Select a track and configure it

Press one of the 16 **track** buttons to select a track. The active track is indicated by a bright steady white light on the corresponding pad.

Hold **track** to enter the track settings menu: midi output, midi input, pattern length, run modes.

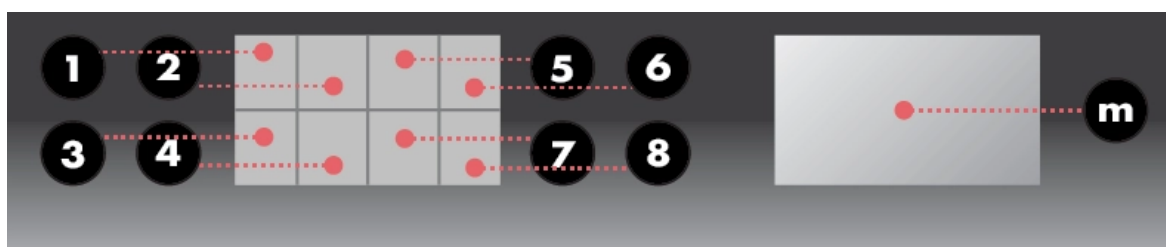


Hold **2ND** + Press **track** to enter the secondary settings menu: configure track name, quantize pattern, load instrument definition, import/export midi files, enable project transpose and project scale.



## 1.8. Tweak parameters

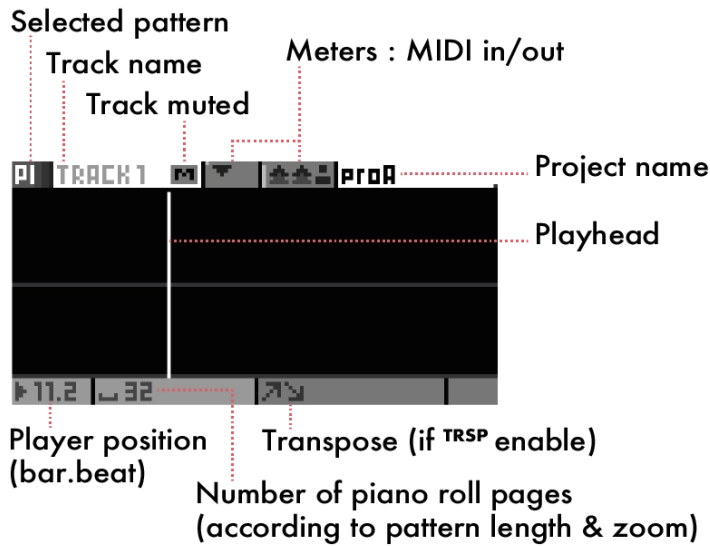
The group of 8 encoders always controls the left screen parameters, and the menu encoder controls the right screen:



Tip **Hold** an encoder to reset a parameter to its default value.

Tip **Hold 2ND** and rotate encoders to scroll faster.

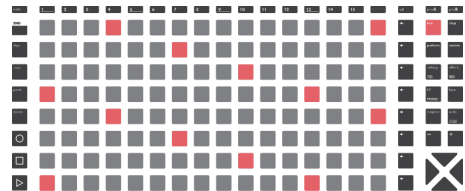
## 1.9. Upper & lower bars



## 1.10. Quick tour of the 4 modes

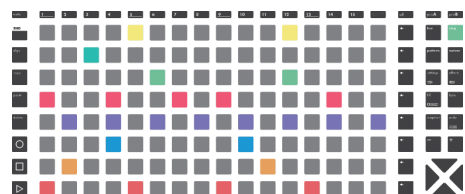
### live MODE

Use the 128 pads as a scale keyboard or as a chord generator (to change the livemode, hold live and rotate the menu encoder).



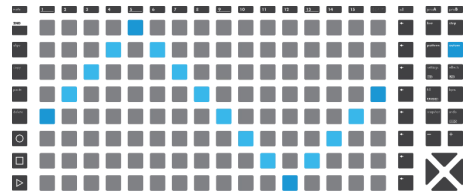
### step MODE

Use the 128 pads to add or fine tune notes (or drum events) with surgical precision.



## **automation** MODE

Use the 128 pads to create midi (or fx) automation.




## **pattern** MODE

Perform in sync by using the 128 pads to set the playing pattern of each track. Create sections (group of patterns). Chain sections to build a song.



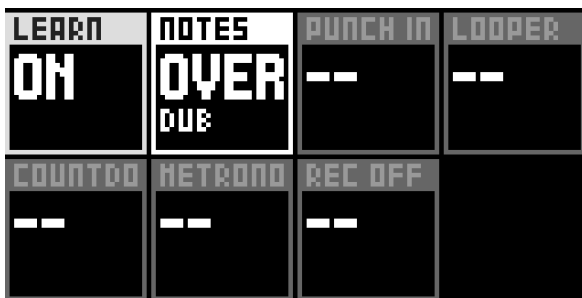
## 1.11. Live recording

Press record  while playing to capture your live performance, coming either from:

- the **live** mode keypad 
- an external MIDI instrument or controller
- a modular system sending CV/Gate
- a computer

You can only record on the currently selected track.

Hold **2ND** + Press **settings** to enter the rec Settings:



## 1.12. Step mode essentials

Press **step** to enter the Step mode.

Press any matrix pad  to enter a note.

Press it again to delete the note.

Left screen parameters contains the default values for a note. Any newly added note will inherit those values:



The upper-left parameter is the note displayed on the pad matrix's bottom row. By rotating the corresponding encoder, you can scroll up and down in the piano roll

view. A viewport on the screen frames the notes displayed on the matrix pads:



Selection: Hold a Step already filled with a note to finetune any parameter. You can also select multiple notes at the same time.

## 1.13. Setting the length of a pattern

Hold a **track** to enter its settings:



Change the length of the active track Pattern with the corresponding encoder.

**Tip** When in Live or Step mode, Hold **2ND** + **+** or **-** to quickly double or halve the track length.

**Tip** When in Live or Step mode, Hold **2ND** + **▶** or **◀** to quickly double or halve the Track length and duplicate the events of the page.

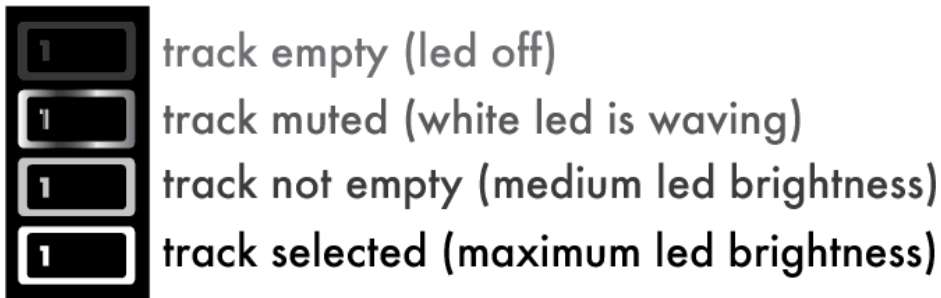
## 1.14. Mute tracks

Hold **mute** and Press one or more **track** buttons.  
Selected Tracks start to flash: they form a mute group.

Release **mute** to apply the mute state on selected tracks.



Track status on leds:



**Tip** Hold **2ND** **mute** and Press a track to instantly mute/unmute it. You can also disable the mute group feature in settings MISC.

## 1.15. Mute projects

Hold **mute** and Press **proA** and/or **proB** : the projects will be muted/unmuted at the same time, in sync, at the end of the bar.

A popup will appear, displaying the projects waiting to be muted.

It's the easiest way for mixing projects and perform transitions with perfect timing. Please read the manual page **PROJECTS** for more info about projects/songs mixing.

**Tip** Hold **2ND** **mute** and Press **proA** or **proB** to instantly mute/unmute it.


## 1.16. Track types

By default, the 16 tracks are set to track type POLY.

**Hold** **step** + **Rotate** the main encoder to choose the type of the active track, which can either be a Poly track, a Drum track, or an MPE track.

### Poly tracks

Best suited to polyphonic or monophonic synthesizers.

**live** mode can either be an isomorphic keyboard, to play notes directly on the pad matrix , or a chord generator.

**step** mode is a fully featured step sequencer.

### Drum tracks

Designed for grooveboxes and samplers, drum tracks are made of 8 drum lanes, each having their own note values and channels.

**live** mode is a grid of eight zones, one for each lane, divided into 16th velocity levels. Use it to record and add nuances to your beats.

**step** mode is a drum-oriented step sequencer, in which you can edit your drum lanes.

### MPE tracks

MPE tracks are used to record and playback MPE performances.

**live** mode is similar to the Poly tracks live mode.

**step** mode offers the same functions as in Poly tracks, but gives you the possibility to edit each expression parameter of any recorded MPE note.

## 1.17. Quantize

Hold **2ND** + **track** to enter the secondary settings of a track.

Configure the real-time quantization amount/strength of the track with encoders ① and ②, in order to soften the timing imperfections your recording, from – (quantize disabled) to **1/16**.



QUANTIZE STRENGTH  
1/16 100%

You can also configure a global Quantize for all tracks by holding **proA** or **proB** and enabling Project Quantize:



PQUANT  
1/16

## 1.18. Project scale

One major feature of Hapax is the ability to set a global scale for each project, which will constrain all notes to the selected pScale. It provides a simpler interface without “wrong” notes.

Hold **proA** or **proB**, enable pScale with encoder ① and select your favorite scale and key with encoder ②, ⑤ and ⑥:



PSCALE KEY COLOR SCALE  
ON ↓ C NESS 2ND  
-IAN MODE T

You can set a new scale anytime and in real-time, it's a great studio tool to color your song.

## 1.19. Undo/redo

To undo your last actions, such as parameter changes, new notes, or a recent recording, simply Press the **undo** button.

Hold **2ND** + Press **undo** to redo changes.

You can use undo/redo multiple times until you are back in the desired state.

## 1.20. Snapshot

Snapshot is both a performance and a studio tool. Hold snapshot to capture the current version of your pattern: notes, automation, parameters...

Then play around with your pattern: change notes, parameters, add automation — you always have the safety net that is your captured pattern. Press snapshot to toggle between your captured version and your working version.

## 1.21. Assign

Hold **2ND** + Press **fill** to display assignments on the left screen.

This submode allows you to remap the 8 encoders to any MIDI message, CV output or FX parameter of your choosing: Press one of the 8 encoders and select the destination.

Each track has its own set of 8x assignments. Perfect for using Hapax as a midi controller, or doing automation knob-recording with midi messages.



**Tip** If you assign to a MIDI message, it will be interpreted as though it came from an external controller, meaning you can do knob-recording!

## 1.22. Project tempo

### BPM

Press **bpm** to open the BPM popup and:

- Rotate the menu encoder to change the BPM value.
- Press the menu encoder to select the after-decimal digits, then Rotate to fine-tune the BPM.

### Tap BPM

Press **2ND** + regularly tap **bpm** button to set the tempo:



### Time elasticity (phasing)

While BPM changes the global playback speed of both projects, you can use the time elasticity feature to change the playback speed of each track individually.

Press **bpm** to enter BPM popup. Toggle menu encoder until elasticity % is highlighted. Then Rotate menu encoder to change elasticity value (you can also fine-tune the last digits).

For example, if the global BPM is set to 120.00, and you are working on track 01:

- set elasticity to 50%: track 01 playback is two times slower = 60 BPM
- set elasticity to 200%: track 01 is two times faster = 240 BPM
- set elasticity to 100.50%: track 01 is slightly faster and will slowly drift out of phase with the other tracks. Phasing is the main concept used in "Steve Reich - Piano Phase".

In Hapax, time elasticity is a way to achieve polyrhythms (two rhythms being played concurrently).

## 1.23. Connectivity: MIDI/Cv inputs

Hapax can simultaneously receive MIDI from all 16 channels of each of its 4 inputs: in A, in B, usb host (usually a controller), usb device (usually a computer).

It represents a total of 64 MIDI in channels, plus the two Cv in that can be used as a CV/Gate input.



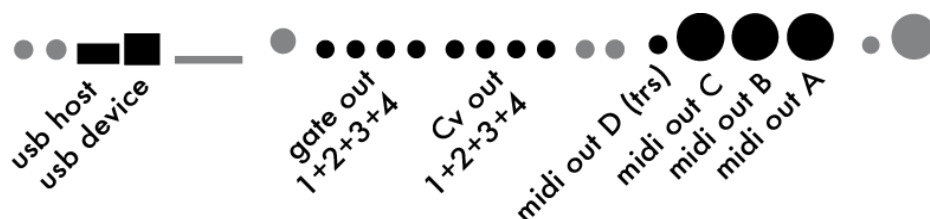
To link an external midi controller (sending midi events like notes, cc, pitch, ...) to one Hapax track, **Hold** a track and select the input/channel.

To sync Hapax with an external source (make Hapax follow the BPM and play/stop), press settings, enter sync in and set the clock source.

## 1.24. Connectivity: MIDI/Cv outputs

Hapax can simultaneously send MIDI to all 16 channels of each of its 6 outputs: A, B, C, D, usb host (usually a controller), usb device (usually a computer).

This allows for a total of 96 MIDI out channels, plus the 4 pairs of CV/Gate outputs.



To link one Hapax track to a synthesizer, a drum machine, a Eurorack system, another sequencer... : **Hold** a track pad and select the output/channel.


To send sync messages to midi (or gates) outputs: press settings and enter sync output.

## 2. Basics

# 3. Live mode

## 3.1. Overview

**live** mode is the best place to start composing a track.

This mode turns Hapax into a MIDI controller that you can use to experiment and record your music using the built-in pad matrix  or an external keyboard. Depending on the current type of your track, you will have access to three different live modes.

### Livemode SCALE

On **POLY** or **MPE** tracks, play some notes on the built-in isomophic keyboard, and add a scale to quantize their pitch.

Hold **live** + Rotate the main encoder to switch to livemode scale.

### Livemode CHORD

On **POLY** or **MPE** tracks, effortlessly build and play some colorful chords.

Hold **live** + Rotate the main encoder to switch to livemode chord.

### Livemode DRUM

On **DRUM** tracks, play your drum kit with the pads, divided into zones of 16 velocities.

A simple Press on the **live** button will lead you to the livemode drum.

You will find many useful tools in those modes, such as a quantizer, scales and chords generators, hold/relatch options, chord recognition, a live looper, and of course a lot of real-time effects (arpeggiator, harmonizer, swing...).



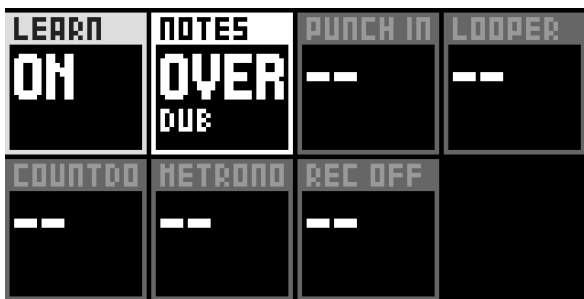
## 3.2. Record your performance

Press **REC** (and **PLAY** if your sequencer is stopped) to record your performance. When you will start playing, you will notice that notes are starting to appear on the piano roll screen.

**NEW!** It is possible to record events on several tracks at the same time. To learn about this feature, please check the **Multitrack recording** chapter on *this page*.

Recording settings can be accessed through the **REC** menu.

Press **2ND** + **settings** to enter this menu.



**LEARN** OFF ON

Toggle this parameter off to completely disable the note learn in **step** mode.

**NOTES** HARD REC OVERDUB

When hard recording is selected, the previously recorded notes will be erased upon a new recording. Overdub allows to merge incoming notes with the existing ones.

**COUNTDOWN** OFF ON (1 BAR) ON (2 BARS) ON (3 BAR) ON (4 BAR)

When enabled, Hapax will play a countdown before the recording starts. The track must be armed beforehand with a **Press** on rec **REC**. The countdown time can be set from 1 bar to 4 bars.

**METRONOME** OFF ON

Enabling Metronome will output a quarter note when the sequencer is playing. The output routing and other parameters of the metronome can be set in the misc.

**settings**.

**PUNCH IN** OFF ON

Press **REC** to arm your track. If punch-in is enabled, Hapax will wait for the first

incoming note to automatically start recording.

#### **LOOPER** OFF **AUTO LENGTH**

This option provides a way to capture your performances as if you were using a looper pedal. The length of your track is not predefined, and will be determined by the final length of your recording.

First, **Press** **rec** **O** to start recording a loop.

**Press** **rec** **O** a second time to stop recording. The track length will now be set, and the track will start to loop.

**Tip** When recording with auto-loop, press the live-looped-track button to set the track length while keeping **REC** enabled.

#### **REC OFF** OFF **END PATTERN**

If enabled, this parameter will allow the recording to stop automatically when the sequencer reaches the end of the pattern.

### 3.3. Quantize your performance

The real-time quantizer is very useful for correcting the timing of a live played recording, or for applying rhythmical variations on a pattern.

Each track quantize parameters can be set independently. **Hold** **2ND** + **Press** **track** to enter the track secondary setting window:



**Rotate** encoder ① to enable and set the rate of the quantizer. 1/16 is the coarsest setting, 1/64 is the most precise.

**Rotate** encoder ② to set the strength value of quantization.

While 100% strength value will apply maximum quantization to the notes, lower values will allow the notes to be slightly off-grid.

Tweak this parameter to taste to find the balance between straight and swung feel in your tracks.

### 3.4. Accross live and step mode


Any note recorded in **live** mode can be seen and edited in **step** mode.

Moreover, all notes and chords played on an external controller or using the live mode keypads are captured in step mode and displayed on the left screen under **LEARN**. Those learned notes can be added with a single press of a pad in **step** mode.

More info about **LEARN** : *[click here](#)*.

# 4. Livemode Scale

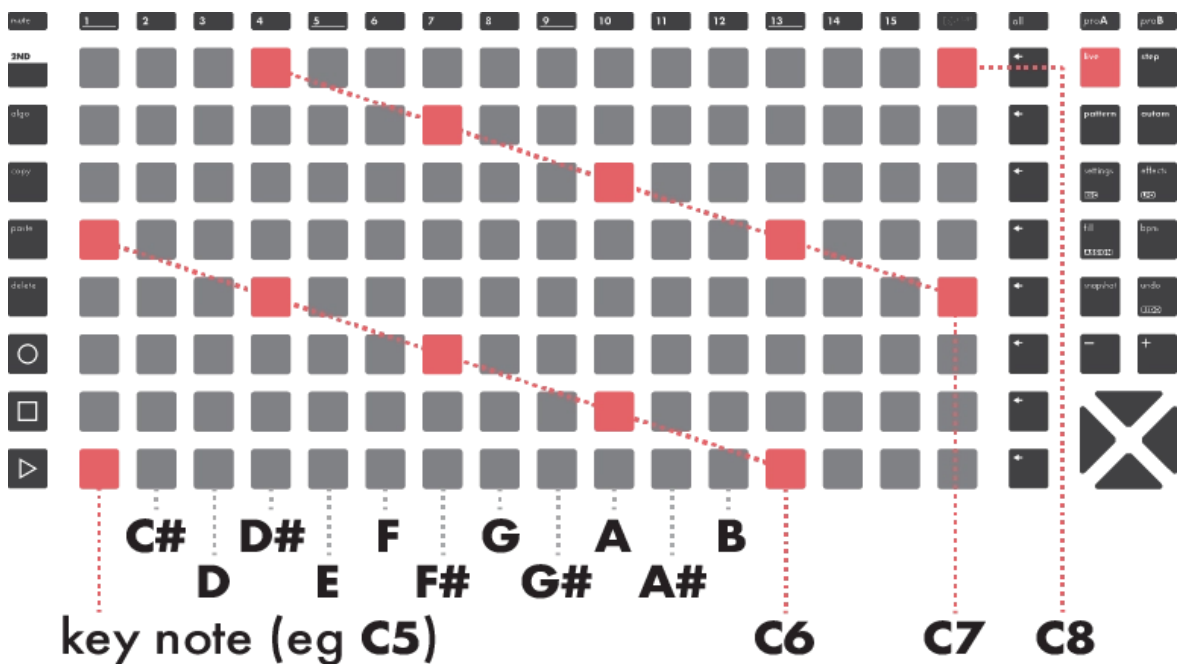
## 4.1. Overview

In this mode, the pad matrix  is used as an isomorphic keyboard. This leverages the property of *transpositional invariance*, very useful for playing chords in various keys:

Any given sequence and/or combination of musical intervals has the same shape when transposed to another key.

- Wikipedia

By default, this isomorphic keyboard is chromatic, with a row-jump of 3 semitones : for any given pad, the pad to its right plays 1 semitone up, and the pad above it plays 3 semitones up.



When applying a scale, the keyboard will no longer add 1 or 3 semitones, but will move up by 1 or 3 *degrees* of the scale. For example, in chromatic mode, a pad up would translate into a minor 3rd jump, whereas in a major key, it would give us a fourth jump.

## 4.2. Basic operations



Press or to set the octave of the lowest note of the pad matrix.

Rotate encoder ① in order to set the lowest note of the pad matrix.

Rotate encoder ② to enable hold or relatch.

Rotate encoder ③ to set the velocity of the played notes.

Rotate encoder ④ to set how many notes separates a given row from the row above it.

Rotate encoder ⑤ to change the scale color.

Rotate encoder ⑥ to change the scale type.

Rotate encoder ⑧ to set the way that notes are displayed on the pad matrix:

### **KEY**

Displays a simple layout indicating the different positions of the root note and of the played notes.

### **NOTES IN PATTERN**

Only displays the notes that are stored in the **step** mode of the current pattern.

### **CHROMATIC+SCALE**

Always displays the chromatic scale (all the 12 notes), but highlights the notes of the currently selected scale.

## 4.3. Scales

### **COLORS**

Hapax comes with 72 factory scales, sorted by families called colors.

Scales of the same color are sharing the same third and/or seventh degree, so that you can replace a scale by another of the same color without radically changing the feel of you track.

The different colors are listed below, along with their respective scales :

### **MAJOR**

Major, Harmonic, Augmented, Pentatonic, Pentatonic (V), Pentatonic (Ionian), Arabic

### **MINOR**

Dorian, Aeolian, Phrygian, Japanese, Spanish, Pentatonic, Pentatonic Dorian, Pentatonic Pelog, Blues, Romanian, Gypsy b7, Hawaiian, Melodic, Harmonic, Diminished, Gypsy

### **DOMINANT**

Myxolidian, Arabic, Blues, Pentatonic, Pentatonic (IV), Pentatonic (D II), Lydian, Melodic Major, Phrygian, Diminished, Tritone, Altered, Rock n Roll, Whole Tone, Inverted (Aug)

### **SUSPENDED**

Mixolidian, Pentatonic, Ritusen, Dorian (b2)

### **HALF-DIMINISHED**

Half-Diminished, Locrian, Pentatonic Minor b5

### **DIMINISHED**

Diminished, Half Tone, Romanian, Ultralocrian, Blues Heptatonic

### **MESSIAN**

2nd mode T, 3rd mode, 4th mode, 4th I mode, 5th mode, 5th I mode, 6th mode, 6th I mode

### **INTERVALS**

Minor Thirds, Major Thirds, Fourths, Fifth Octave, Octave

## 4.4. Hold and relatch

Hold and Relatch options are accessible through the **PLAY** parameter on the left screen. All held or relatched notes will remain highlighted on the pad matrix.

**Rotate** encoder ② to enable Hold or Relatch.

### **HOLD**

The classical toggle mode. When notes are played, they will be held until the same notes are played again.

### **RELATCH**

The held notes will be replaced by any new input of notes.

**Tip** Hold is very useful when designing drones/synth pads or experimenting with effects, such as an arpeggiator.

## 4.5. Chord recognition

The name of the currently played chord is displayed under the keyboard representation on the left screen. The number between brackets is the inversion index of this chord.

For example, if **C-E-G** is played, Hapax will indicate **Cmaj**, as well as the second chord name **Em6** in second inversion:







## RIGHT HAND

Press the bottom pads to input an initial chord.

## LEFT HAND

Press a pad of the left part of the pad matrix. A modifier will temporarily be added to the chord. Up to 8 modifiers can be stacked per track to enrich chords.



## 5.2. Right hand - Chord generator

Press a chord pad on the pad matrix to play a chord.

Rotate encoder ⑤ and ⑥ to select a selected scale. If a project scale is enabled, it will be used instead.

Each chord pad represents a scale degree : if the pentatonic scale is set, five chords will be available on the pads, as this particular scale contains five degrees. Harmonizing a scale is done by stacking thirds of a scale.

As an example, a **C Major** scale harmonisation leads to the following chord degrees :

**Maj7 - min7 - min7 - Maj7 - Dom7 - min7 - Half-dim**

Scales, when used as basis for chords, entails vast possibilities, which are yours to discover!

## 5.3. Left hand - Voicings

Chords that are played by the bottom pads are in common root position. Add some modifiers to spice things up!

Up to 8 modifiers can be stacked per track. The stacking order is important, as each modifier is processed sequentially.

**Press** a modifier pad to momentarily add it to the list. Its name appears on the right screen.

**Tip** Hold **2ND** and **Press** a modifier pad to add or remove it from the list. The modifier no longer requires to press a pad to be applied.

The different modifiers are described below :

## **OCTAVE**

### **OCTAVE +1/-1**

Each chord note is raised/lowered by one octave.

### **OCTAVE +2/-2**

Each chord note is raised/lowered by two octaves.

## **SPREAD**

### **SPREAD UP**

Takes one out of two chord notes and raises them one octave up.

### **SPREAD UP ++**

Takes one out of two chord notes and raises them two octaves up.

### **SPREAD DOWN**

Takes one out of two chord notes and lowers them one octave down.

### **SPREAD DOWN ++**

Takes one out of two chord notes and lowers them two octaves down.

## **ROTATE** +1 +2 +3 +4

Chord inversions are displayed under the keyboard representation on the left screen. Inversions are great for making chords match with each other.

## **VOICINGS**

### **SPREAD UP+DOWN**

Applies **SPREAD UP** and **SPREAD DOWN** at once.

### **WIDER INTERVAL DOWN**

Rotates the chord until the wider interval is in the lowest part of the chord.

### **QUARTAL VOICING**

Replaces thirds by fourths.

## **EXTENDED CHORDS**

### **POWER CHORDS**

Only keeps root & 5th.

### **SUS2**

Replaces the 3rd by a 2nd.

### **SUS4**

Replaces the 3rd by a 4th.

### **ADD 6TH**

Replaces the 7th by a 6th.

### **ADD 6/9**

Replaces the 7th by a 6th, and adds a 9th.

### **KENNY BARRON**

Adds a 9th and an 11th. Best used on minor chords.

## **BASS (DROP)**

### **BASS ROOT**

Drops the root note by an octave.

### **BASS THIRD**

Drops the 3rd by an octave.

### **BASS FIFTH**

Drops the fifth by an octave.

### **BASS SEVENTH**

Drops the 7th by an octave.

## **TRANSPOSE** +1 +2 +3 +4 +5 +7

Transposes the entire chord in semitones. **+5** is equivalent to a perfect 4th up, **+7** to a perfect 5th up.

## 5.4. Auto inversion



This special modifier unlocks for you a well known pianist skill, which is moving as few fingers as possible from one chord to another.

Press the red modifier pad to activate.

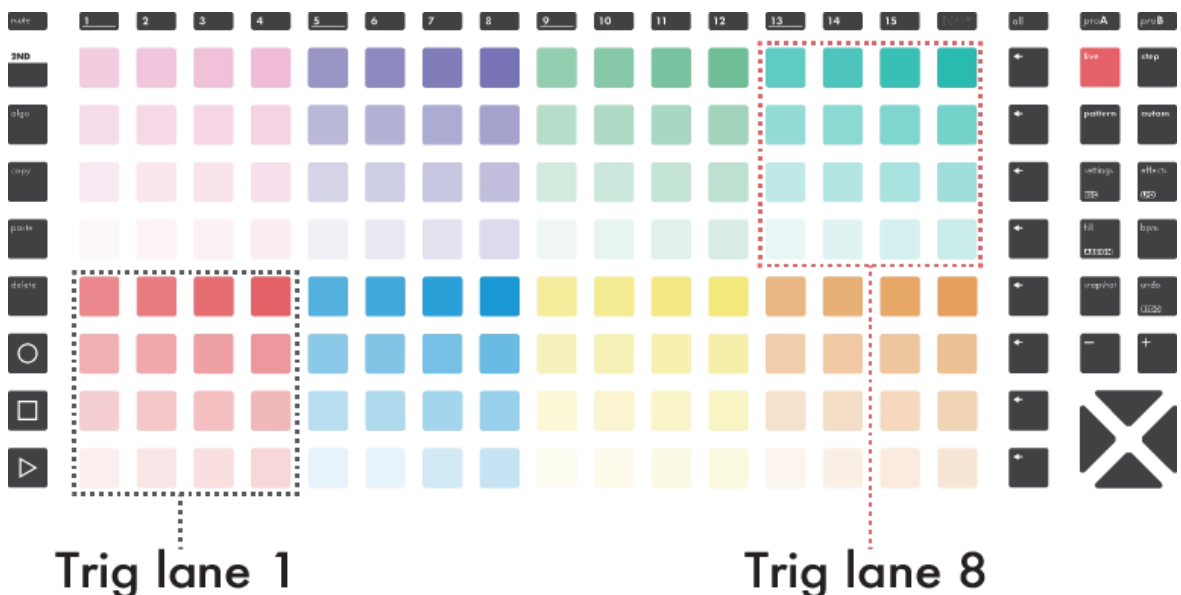
# 6. Livemode Drum

## 6.1. Overview

**LIVEMODE DRUM** is designed specifically for drum machines, grooveboxes and samplers. This mode gives you the ability to play your kits with different velocities.

Hold **step** and Rotate the main encoder to switch the track type to **DRUM**.

Then, Press **live** to enter the **LIVEMODE DRUM**.



The pad matrix is divided in 8 zones, corresponding to the 8 drum lanes of the track. Pressing a pad will trigger the sound mapped to the corresponding lane. The velocity values are indicated by the brightness of each pad.

Rotate one of the eight encoders to change the lane note number.


Hold & Rotate an encoder to change the lane output channel or gate number.

**Tip** For more information about **DRUM TRACKS**, please visit *this section*.

# 7. Step mode

## 7.1. Overview

The **step** mode is a different way to create rhythms and melodies. Unlike the **live** mode — where you perform in real-time using the matrix keypads — this mode allows you to program sequenced events directly into the current track. It is a great way to get the best out of your synthesizers and drum machines.

Hapax a 128-pad matrix  to program step-by-step rhythms and melodies effortlessly and efficiently. The length of a track can be extended up to 32 bars. In conjunction with extreme zooms, conditional trigs, chance, loop points, selection, scale folding, run modes, possibilities are endless!

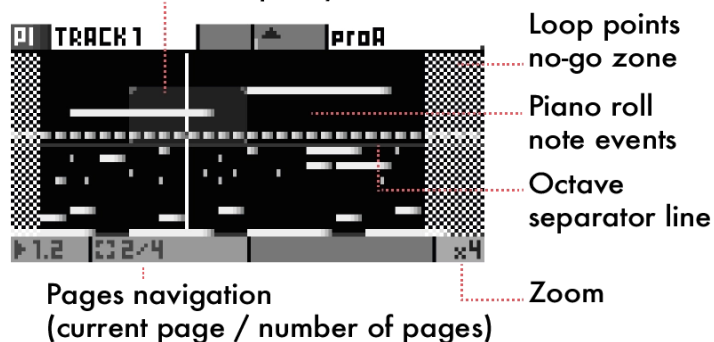
The **step** mode can also be used to edit a previously recorded live performance, using the piano roll view.

The **step** mode, like the **live** mode, always displays the events contained the current pattern of the active track. Each pattern of each track has its own events.

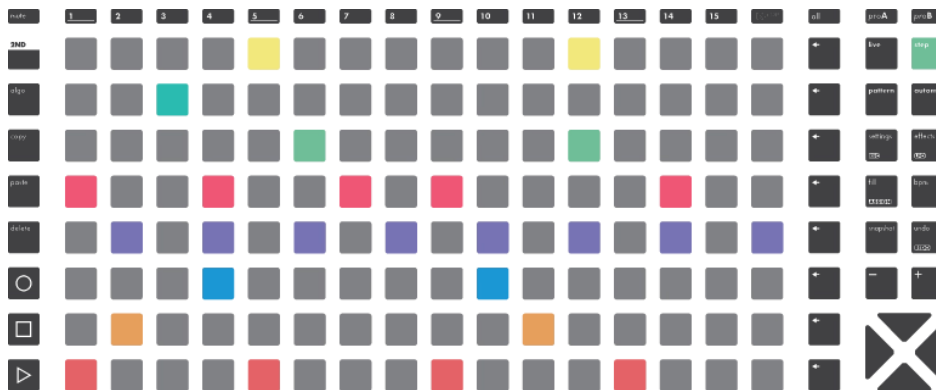
## 7.2. Piano roll overview

The piano roll is always displaying the full current pattern on the right screen. The grey rectangle inside is called the viewport. It indicates which portion of the page that is shown on the pad matrix.

Viewport navigation (selected page you can view on the 128 matrix pads)



The 128-pad matrix always displays the current page, depending on the current zoom and track length settings:



The lower-left pad holds the note set in the upper-left corner of the right screen.

**Tip** In case you are lost in the piano roll, a simple **step Press** will automatically focus the pad matrix onto the closest note.

**NEW!** By default, the displayed page follows the playhead. To temporarily lock the view to the current page, simply **Press** or . A single **step Press** will revert back to the default behavior. This option can be permanently disabled in *this section* of the settings.

## 7.3. Basic operations

**Press** a pad of the matrix to add a note.

**NEW!** Adding a note while the sequencer is stopped will send a short pre-listen of this note to the output. This behavior can be disabled in *this section* of the settings.

**Rotate** encoder ① to set the lower-left note of the pad matrix. The main encoder can also be used. A third way to perform this action is to **Hold** **2ND** and **Press** or .

**Rotate** encoder ② to set the octave. You can also **Press** or .

**Rotate** the other encoders to change their corresponding parameters.

**Hold** **track** to enter the track settings.

**Press** **+** to zoom in, **Press** **-** to zoom out.



Press **▶◀** or **◀▶** to navigate between pages.

**Tip** Hold **2ND** + **+** or **-** to double or halve the length of the pattern.

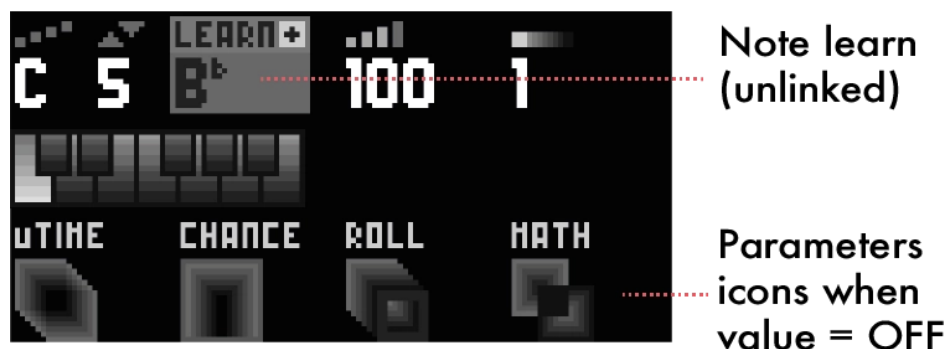
**Tip** Hold **2ND** + **▶◀** or **◀▶** to duplicate/divide the pattern along with its events.

**Tip** Hold a pad of the matrix to override the global parameters with the ones contained in this pad (quick copy function).

## 7.4. Note parameters

Each note event includes its own set of 8 parameters : Note & Octave, Velocity, Length,  $\mu$ Time, Chance, Roll, Math.

Step parameters are visible on the left screen. Each one of them is connected to its own encoder :



To adjust the global note parameters, simply set the values with the encoders. The notes that will be added will be created with those attributes.

To modify the parameters of existing notes, Hold a pad or a selection of multiple pads.

**NEW!** Modifying the pitch, octave or velocity of existing notes while the sequencer is stopped will send a short pre-listen of those notes to the output. This behavior can be disabled in *this section* of the settings.


**PITCH + OCTAVE** **C0 (0)** ... **G10 (127)**

Sets the midi note pitch & octave.

**VELOCITY** 0 ... 127

Sets the midi note velocity.

**NOTE LENGTH** 1/16 ... INFINITY

Sets the length of the note in steps. A step corresponds to a 16th note when using the default zoom. Infinite notes won't stop or be retriggered until the  button is pressed.

**NEW!** Note lengths can also be quickly adjusted for existing notes: Hold a pad containing the note and tap another pad to set the end of the note. For a length of 1 step, Hold the pad and tap a pad placed on the same column.

**U TIME** -50% ... +50%

Time offset : slightly moves the note around its central step position. On the right (+) the note will be delayed, on the left (-) the note will play sooner.

**CHANCE** 0% ... 100%

Sets the probability for the note to be played.

**ROLL** 1/8 ... 1/256

Note will repeat throughout its length (ratcheting)

**MATH** /SYNC SYNC, /PREV PREV /1ST 1ST ...

Conditional trigs allow you to set a condition to a note to be played. Here are some examples :

- 1:2 — note plays the 1st time, every 2 loops
- 2:3 — note plays the 2nd time, every 3 loops
- !2:4 — note not plays the 2nd time, every 4 loops
- FILL — note plays if the fill button is pressed
- !FILL — note plays if the fill button is released
- PRE — note plays if last condition of track was valid
- SYNC — note plays if added on 1st step of a beat
- NT=0 — plays only if no other notes are played
- PB<5 — plays if last beat played less than 5 notes
- NO FX - note is not sent to the FX chain

**Note** All conditions are listed in the 'Math (conditional trigs)' section at the end of this chapter.

**Tip** When scrolling through the Math parameter, RGB leds are dimmed to highlight events with the same Math parameter. This visual feature also works for Roll and Chance parameters.

**Tip** **Hold** an encoder ①...⑧ to reset a parameter to its default value. For example, **Hold** **all** to select all notes, and **Hold** the uTime encoder ⑤ to quantize all notes to their closest time position.

## 7.5. Note selection

You can select one, or a group of notes to edit all their parameters at the same time.

### Single-event selection

Hold a note on the pianoroll. The pad color will change and the selected note parameters will be displayed on the left screen.

Keep holding the pad and rotate one of the ①...⑧ encoders to change the corresponding parameter.

**Tip** Hold a note pad momentarily to override the global parameters values with the values contained in this note.

### Multiple-events selection

Hold a pad on the piano roll, then Hold another pad to select multiple notes. You can now edit the parameters of all the notes contained in your selection.

You can Hold **all** to select all events, or Hold a **row** to select a single row of events across the pattern. Hold more than one **row** to select a range.

While selecting steps :

Press **▶** or **◀** to move your selection left/right

Press Up or Down to move your selection up or down

Press **mute** to mute/unmute your selection

**Tip** By default, a multiple-events selection will select all notes on the vertical axis inside your selection. Hold **2ND** while making your selection to constrain your selection to the selected notes.

**Tip** Press **2ND** during an **all** or **row** selection to toggle between single-page and all-pages selection.

**Tip** Pressing **+** or **-** will either rotate or warp your selection, depending on the MISC setting "Select +/-".

## Warping

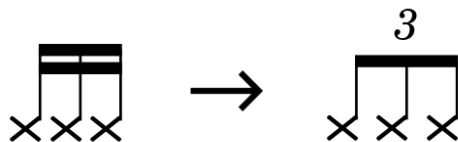
When a multiple-events selection is active, you can warp your events in time by using **+** and **-**.

In other words, you can compress or expand rhythms.

### Example 1

1. In zoom x1, place three events on consecutive pads, to create three 16th notes.
2. Now select these events, making sure the selection spans exactly three columns, i.e. three 16th notes.
3. Press **+**.

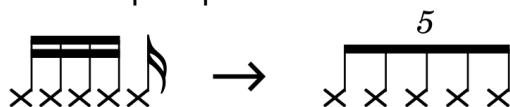
The three events now span four 16th notes, and are still regularly spaced, which results in triplets.



### Example 2

1. In zoom x1, place five events on consecutive pads, to create five 16th notes.
2. Now select these events, making sure the selection spans exactly five columns, i.e. five 16th notes.
3. Press **-**.

The five events now span four 16th notes, and are still regularly spaced, which results in quintuplets.



Of course, you can press **+** and **-** multiples times, and program complex rhythms, polyrhythms and swings easily.

## 7.6. Track length, zoom and navigation

### Length

Each of the 16 patterns of each track can have a different lengths. The track length can be set between 1 and 32 bars.

To set it, **Hold** a **track** and use encoder **Ⓢ**. You can **Hold** + **Rotate** encoder **Ⓢ** to increment the length in steps.

**Tip** Quick length modifiers :

**Hold** **2ND** + **+** to double pattern length

**Hold** **2ND** + **-** to halve pattern length

**Hold** **2ND** + **⌂** to double pattern length and copy events

**Hold** **2ND** + **⌂** to halve pattern length and delete events

### Zoom

**Press** **+** or **-** to zoom in or out.

**Press** **+** and **-** at the same time to **Toggle** between regular and triplet zooms.

### Navigation

A page is what you can see on the matrix pads, represented by the smaller grey rectangle on the piano-roll screen, called viewport.

When increasing the track length or zoom values, the viewport will exceed one page. The pianoroll screen will always display the entire pattern with all its pages.

**Press** **⏪** or **⏩** to navigate to previous or next page.

## 7.7. Loop points

Loop points allow you to set up in real-time where your pattern begins and ends. Only the pattern inside your loop points will be played. You can set different loop points for every pattern within every track.

When composing, it is a great way to loop a small part you want to focus on. When

performing, you can play with track positions and create interesting effects like beat repeats or polymeters.

**Hold**  and **Press** one of the 1...16 **track** buttons to set your loop point start.

**Hold**  and **Press** one of the 1...16 **track** buttons to set your loop point end.

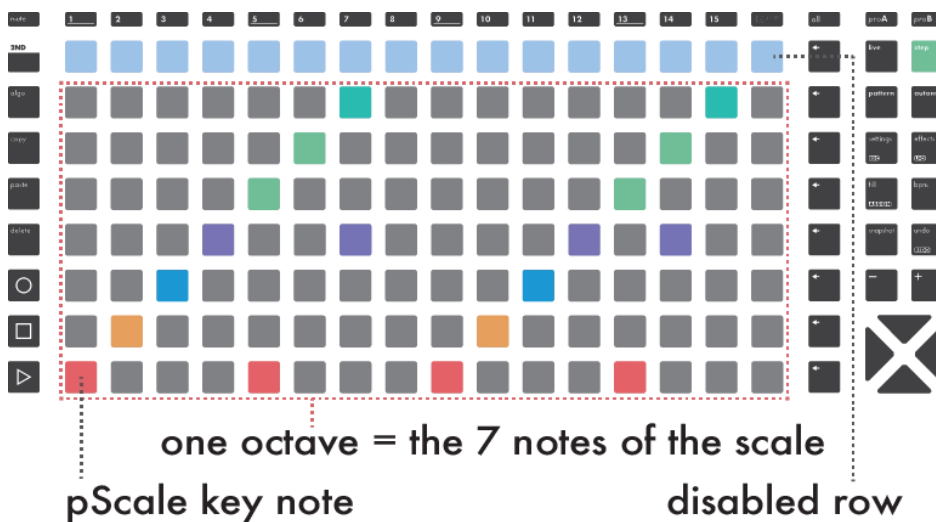
**Press** both  +  to remove the loop points.

## 7.8. Project scale (pScale)

**Hold** **proA** or **proB** to enter the project settings.

Set the **pScale** param to **ON** to enable the project scale.

When a global **pScale** is enabled, the matrix pads only show the notes of the selected scale:



There are never more than 8 notes in a scale, so the 8 rows will always show the same note. For example, if the key note of the scale is **F**, the bottom row will always display the **F** note of the selected octave.

Once **pScale** is enabled, only in-scale notes can be added with the matrix pads. The vertical navigation in the pianoroll is now octave by octave. This simpler interface guarantees that no out of scale note can be added anymore.

**Tip** Even with **pScale** set to **ON**, you can disable it for individual tracks in their secondary setting window. **Press** **2ND** + Track and set **pScale** to **OFF**.

## 7.9. Note learn

**NOTE LEARN** can learn both single notes and chords (multiple notes) from either the **live** mode keypads or an external controller.

Before playing any notes, the left screen will show:



Before enabling **NOTE LEARN**, it is necessary to first play a note on the **live** pads, or on an external keyboard:



At this point, Hapax is not learning notes at this stage, but it has recognised the note input. Press encoder ② to enable **NOTE LEARN**. The display will change to:



The pads are now reflecting notes played in **live** mode, or on an external keyboard. Playing a single note will move the view, so that the bottom row follows the note pressed.

To add this this note, Press a pad on the bottom row.

However, if a chord is learnt (e.g. **C +2**), Press any pad in the column to add this chord to the pattern. If notes were previously added on this column, they will be first deleted.





To turn **NOTE LEARN** off (and so stop the view moving when note are performed from an external controller), simply **Press** (or rotate) encoder ① or ②.

**Tip** **Press** **2ND** + **settings** to enter **REC SETTINGS** and **Rotate** encoder ① to completely disable **NOTE LEARN**.

## 7.10. Math (Conditional Trigs)

Also known as "Conditional Trigs" in the sequencing vocabulary, the math operations are conditions that you can add to individual events to modify their behavior.

A "!" before a condition means **NOT**. For example **!FILL** has the opposite behavior of **FILL**.

### **FILL**

**FILL** Note plays only when **fill** is held.

**!FILL** Note plays only when **fill** is not held.

### **CONDITIONAL**

**1ST** Note plays on first pattern playback.

**!1ST** Note does not play on first pattern playback.

**PRE** Note plays if last condition was valid (track level).

**!PRE** Note plays if last condition was not valid.

### **SYNC**

**SYNC** Note plays if added on 1st step of a beat.

**!SYNC** Note plays if not added on 1st step of a beat.

### **NOTES**

**NT=0** Note plays only if no other notes are played.

**NT<2** Note plays if less than 2 notes are played.

**NT<3** Note plays if less than 3 notes are played.

**NT<4** Note plays if less than 4 notes are played.

**NT<5** Note plays if less than 5 notes are played.

Those conditions are applied at project level.

### **LAST STEP / LAST BEAT**

**PS=0** Note plays if last step played zero notes.

**PS<2** Note plays if last step played less than 2 notes.

**PS<3** Note plays if last step played less than 3 notes.

**PS<4** Note plays if last step played less than 4 notes.

**PS<5** Note plays if last step played less than 5 notes.

**PB=0** Note plays if last beat played zero notes.

**PB<2** Note plays if last beat played less than 2 notes.

**PB<3** Note plays if last beat played less than 3 notes.

**PB<4** Note plays if last beat played less than 4 notes.

**PB<5** Note plays if last beat played less than 5 notes.

Those conditions are applied at project level.

### **ONE IN...**

**1:2 ... X:Y** Plays the note X time each Y loops.

**!1:2 ... !X:Y** Does not play the note X time each Y loops.

### **NO FX** **NEW!**

#### **NO FX IF !FILL**

The note is sent into the FX chain only when **fill** is held.

#### **NO FX IF FILL**

The note is not sent into the FX chain when **fill** is held.

#### **NO FX**

The note is not sent into the FX chain.

**Tip** When **fill** is held, all programmed or recorded events are forced with **MATH = FILL**.

# 8. MPE Tracks

## 8.1. Overview

**MPE**, or Midi Polyphonic Expression, is a recent specification of musical instruments data exchanges, based on MIDI.

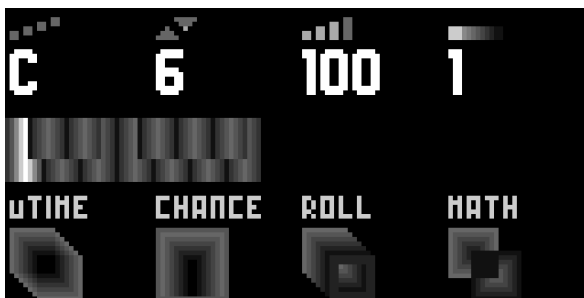
It allows to play a synthesizer in an expressive, articulated way, that approaches the sound and feel of acoustic instruments. Hapax can record MPE controllers, with which you can simultaneously modulate several parameters on distinct notes, like timbre, tonality, pressure or volume.

In HapaxOS 1.0, **MPE** and **POLY** track types are very similar.

## 8.2. Recording and editing

Recording a track using an **MPE** controller is the same process as described in *this section* about recording in **live** mode.

To edit an **MPE** track, you can use the same basic operations, parameter editing and note selection techniques that are described on this page. The **MPE** per-note expression controls can't yet be visualized and edited, but they are contained in the note pads of Hapax. This means you can move notes around, use copy, paste and every other tool at your disposal for editing your **MPE** recordings.

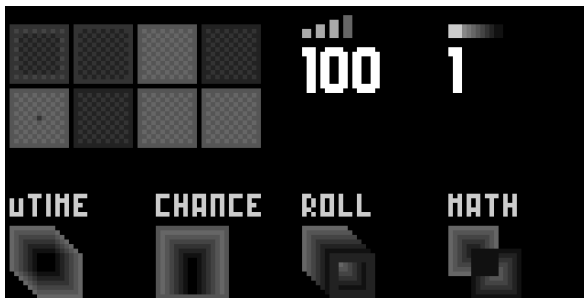


HapaxOS is evolving and will soon allow editing on expressive parameters for each note of an **MPE** track.

# 9. Drum Tracks

## 9.1. Overview

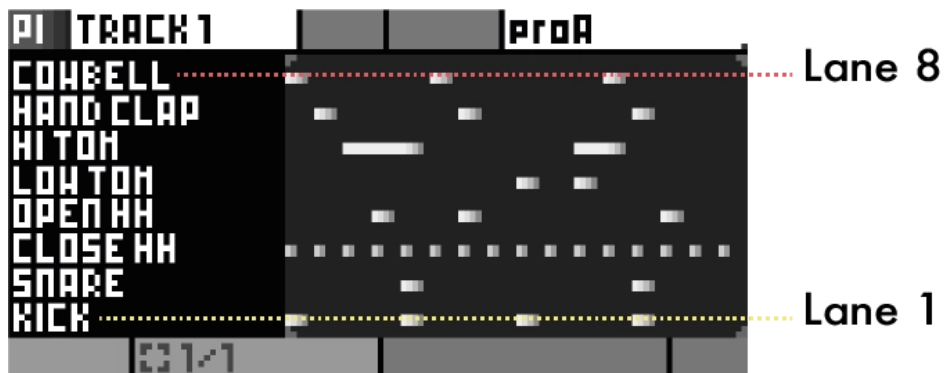
The **DRUM** track type is particularly suited for drum machines, grooveboxes and samplers.



Once in step mode, Hold **step** and Rotate the menu encoder to set the track type to **DRUM**.

In this mode, each percussive element, along with its events, corresponds to a drum lane.

There are 8 lanes in total :





To rename a lane, start by selecting it, then **Press** the menu encoder.

**Tip** To quickly mute an entire lane, **Hold** a **row** button and press **mute**. You can repeat this operation to unmute the lane.

## 9.3. Drum lane MIDI routing

A lane is characterized by its corresponding note. This means that events in a drum lane will always trig the same note. This is ideal for working with drum machines, which usually expect a given note for a given drum element.

Each lane can have its own particular pair of note/channel. It is also possible to have a lane triggering a gate output : you can mix and match multiple machines to create your drums ensemble.

To access the settings of a lane, **Hold** a **row** button:

**NOTE** 0 ... 127

**Rotate** encoder ① to set the note played by this lane.

By default, this parameter sets both the note that will be outputed by the lane and the note that the lane will listen to (the trigger note).

To set a different trig note, **Press** + **Rotate** encoder ①. The input channel of the trig note can be set in the track settings.

Example: Note = 48 and Trig Note = 23.

If you play note 23 on an external controller, this lane will be triggered, and will output note 48.

**CHANNEL** 1 ... 16 **GATE 1** ... **GATE 4** **CV 1** ... **CV 4** **CV/GATE 1** ...

**CV/GATE 4**

**Rotate** encoder ② to set the channel of the lane (each lane can have a different MIDI channel).

A lane can also trig its drum events on a selected **GATE** output or a **CV** output (a **CV** output will act like a gate, with **0-5V** trig levels).

You can use the **CV/GATE** output to perform with drum accents (the gate will trig the event, the **CV** will output the drum velocity).

**Tip** By default, the channel of drum lanes follow the channel of the track. Once it has been changed manually, it is independent from the track's channel.

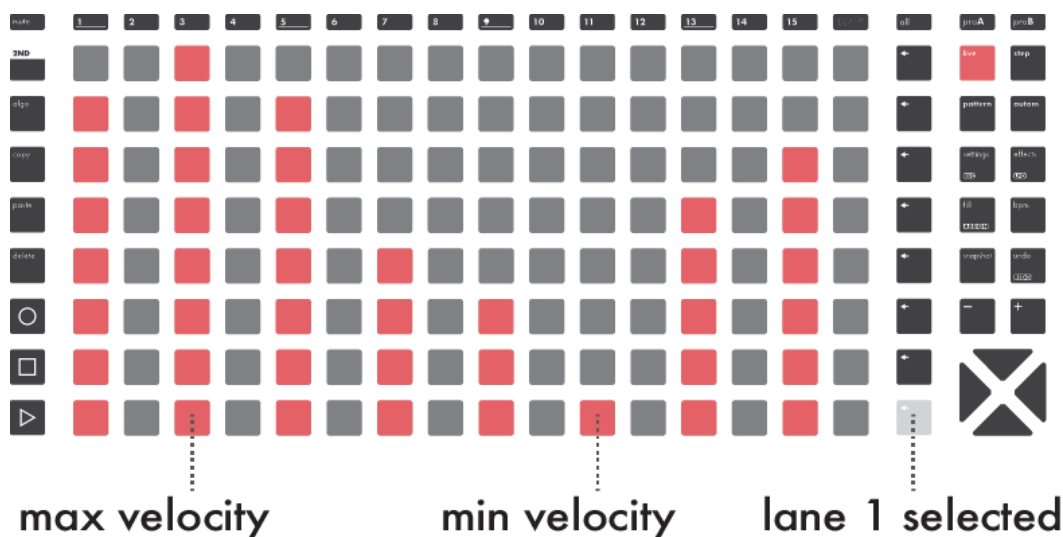
**Tip** Hold one or multiple **row** buttons and Rotate encoder ① or ② in order to change all selected lanes parameters at once.

**Note** On **DRUM** tracks, the midi output channel defined in the track settings does not affect the lanes outputs, although it will be used for midi automation output.

## 9.4. Velocity view

To enter the **VELOCITY VIEW**, Hold **2ND** and Press a **row** to select the lane you want to edit.

In this submode of **DRUM**, the matrix pads show the note velocities of the selected drum lane. Press a pad to change the velocity of an existing note.



To exit velocity view, simply press **step**.

**Tip** Hold **2ND** and press a pad to add events from **VELOCITY VIEW**. Events will be created at a velocity corresponding to the pressed pad. Please note however that pressing the lowest row will delete existing events.

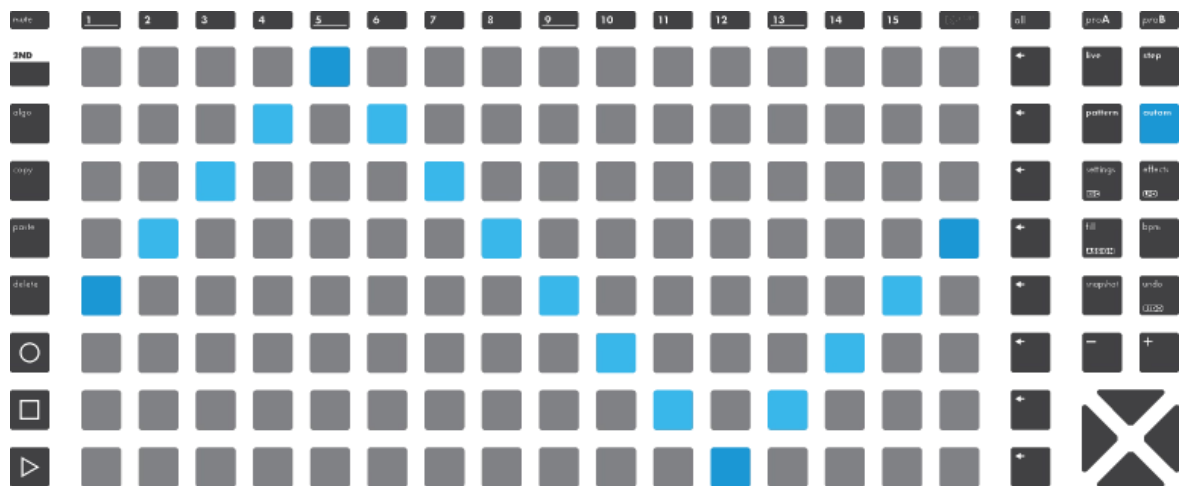
# 10. Automation mode

## 10.1. Overview

The **automation** mode enables you to record and draw automation curves into lanes.

Automation lanes can emit CC messages, control the effect parameters of their track, and even output control voltages.

Each track can hold up to 64 automation lanes, and each pattern of a track can have different automation events.



## 10.2. Creating an automation lane

The automation screen is divided in lanes. Scroll to the bottom of the list, and click on **+ ADD**. You will be prompted to choose a destination, which represents what you wish to automate.

### DESTINATIONS

CC MESSAGES

PITCHBEND

AFTERTOUCH

PROGRAM CHANGE

VELOCITY

Overrides the velocity of the current pattern



### NRPN MESSAGES

Non-Registered Parameter Number

### PAIRS OF CC MESSAGES

For 14 bit CC MSB/LSB

### CV IN

For recording purposes

### CV OUT

### EFFECT PARAMETER

Once the automation lane is created, simply **Press** some pads on the matrix to add or remove automation points, called events.

**Tip** Hold **2ND** and **Press** a pad to put an event at the very end of the step for sharp transient:



The screen below shows the symbols used to represent the content of automation lanes:

CC8 BALANCE	🔒	🔇	📈	RECORD
CC14	🔒	🔇	📈	
AFTERTOUCH	🔒	🔇	📈	
CV2	🔒	🔇	...	
PITCHBEND	🔒	🔇	📈	RECORD
CC4 + CC14	🔒	🔇	📈	
+ ADD				

Six automation lanes are created on the current track:

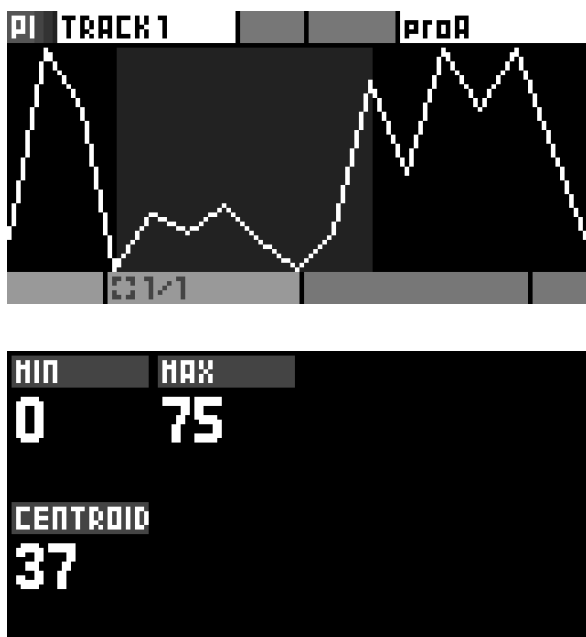
- cc8 has events
- cc14 is locked
- aftertouch is muted
- CV out 2 has no events
- Pitchbend has a default value
- NRPN has events

**Tip** It is possible to create a curve before selecting a destination. Simply **Press** some pads when "+ ADD" is selected. This will create a **VOID** lane, with no destination. Click on a **VOID** lane to assign its destination afterwards. This helps sketching out ideas quickly, by storing curve shapes for later use.

## 10.3. Editing an automation lane

To modify the parameters of an existing automation point, **Hold** a pad filled with an event. Its value will be displayed on left screen and the pad color will change. Scroll the associated encoder to fine-tune displayed value (e.g. 0 to 127 for a midi CC message).

To perform a multiple selection, **Hold** a pad on the matrix, then **Hold** another pad to select multiple events. You can now edit the parameters of all the events contained in this portion of curve, like its minimum and maximum values, as well as a parameter called centroid, which moves the central value of the curve:



## 10.4. Muting an automation lane

Simply scroll to the desired automation in the list, and press **2ND** + **mute** to mute this automation lane. You can also click on an automation lane and select the **MUTE LANE** option.

**Note** Mute states are per-pattern based.

A muted lane is represented by the **M** status icon.

## 10.5. Interpolation

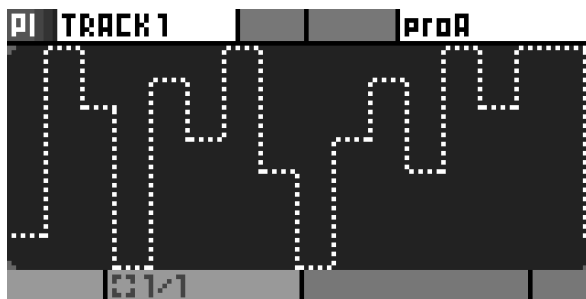
Rotate encoder ⑥ to enable this option and draw lines and curves using very few automation events. This saves memory and time, and can be easier for drawing certain shapes.

Disabling this parameter allow for drawing stepped automation, meaning that values will be held until the next change.

### Interpolation ON

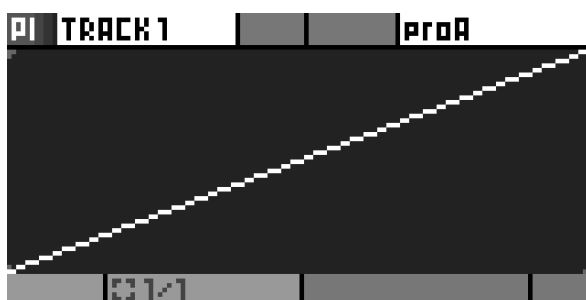


### Interpolation OFF



The default status is always **ON** for automation lanes created manually. However, recorded automation are *not* interpolated by default, to keep the recording faithful to the original.

**Tip** Thanks to interpolation, a ramp can be drawn using only two points :



## 10.6. Default value

Encoder ⑧ allows you to define a default value that will be used if the automation lane is empty. Automation events are stored per pattern.

Default values are useful to send fixed values, without the need of creating any automation event. It also allows to reset a parameter after a pattern change.

For example, setting a default value of 0% on a pitchbend automation can be smart, to make sure that the pitchbend is reset upon switching to a pattern that does not automate pitchbend.



**Tip** If the default value is active on the current pattern, the lane will show the following status icon: "...."

## 10.7. Automation lane context menu

Click on an automation lane to access additional features and actions :

### **MUTE LANE**

Mute the selected lane.

### **CLEAR EVENTS**

Deletes all events on the lane, for the current pattern.

### **DELETE LANES**

Deletes the lane from the entire track. All events in all patterns will be deleted as well.

### **CHANGE DESTINATION**

Changes the destination of a lane, without altering the events.

**Note** Data definition might change, depending on source and destination types : 16bits CV data will be downscaled to 7bits CC data.

### **COPY**

Copies the automation lane events of the current pattern and destination.

### **PASTE**

Used in conjunction with **COPY**, allows to paste an entire automation lane.

### **MAXIMUM RATE (192ppqn ... 1ppqn)**

To avoid saturating a device with too many messages, automation lanes can be configured to output at a given maximum rate. For example, at 24ppqn, an automation lane can send a message at most 24 times per quarter note.

**Tip** While this is primarily intended as a safety feature, to not overload a MIDI device's bandwidth, it can have musical applications, as well. Limiting the max rate to 4ppqn, for instance, will send a message once every sixteenth note at most, which can create very rhythmical parameter changes. This is akin to a sample-and-hold function.

### **LOCK**

With this parameter **ON**, the lane's automation events cannot be modified. Pressing

pads has no effect. Recording will not overwrite the lane events, nor record new ones for this lane.

**Tip** This can prove useful to save a **CV IN** recording, as an unlocked **CV IN** lane will always be overwritten.

**Tip** When a lane is locked, the lane will show the following status icon: 

## 10.8. Copy / paste lanes

Hold an encoder while + **ADD** is highlighted to open a different context menu.

### **INSERT**

Adds a lane. Same action as clicking + **ADD**.

### **PASTE**

In conjunction with **COPY**, pastes an entire automation.

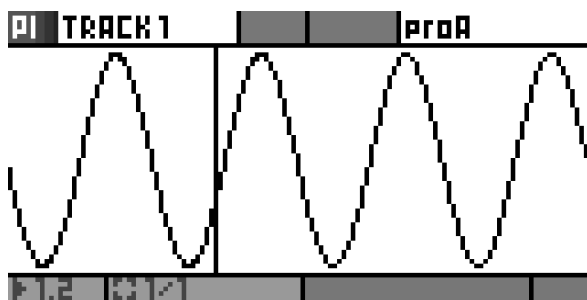
### **PASTE TO...**

Same as **PASTE**, with the possibility of choosing the destination of the pasted events.

## 10.9. Recording an automation lane

When **REC**  is active, you can record incoming data as an automation for the active track.

For MIDI messages recording, such as CC, pitchbend or aftertouch, the lanes are created automatically, as soon as a event is received (with interpolation set to **OFF**) :



For CV in recording, lanes must be created prior to recording.

**Tip** To prevent overwriting a lane with incoming data, you may use the **LOCK** option described in the above section for this manual.

**Note** Recording of program changes and NRPN messages is not supported.

**Note** Regardless of the destination, you can store 1 data point per clock tick. Hapax has a resolution of 192ppqn (192 ticks per quarter note), which means that at 120BPM clock ticks are 2.6ms apart, resulting in a sampling frequency of 384Hz, which according to the Nyquist Sampling Theorem means a maximum frequency of 192Hz can be captured.

**Note** For a given tempo, the maximum frequency that can be captured is:  $f = 192 * (BPM / 120)$





are currently shown on the pads.

**Tip** From any mode : **Hold pattern** + any matrix pad to quickly select (and instantly launch) the pattern you want to edit.

Pattern mode has different playback types to choose from, using encoder ① :

#### PERFORM

To manually perform with patterns (default).



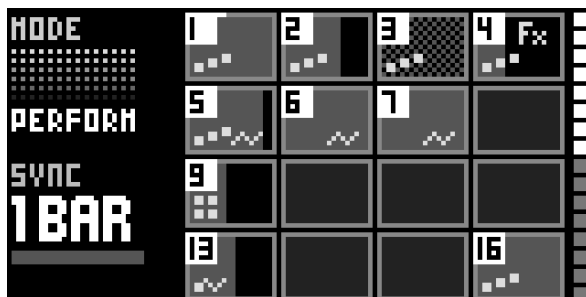
#### PLAY SONG

#### LOOP SONG

Please refer to the *Sections & songs* chapter *below*.

## 11.2. Patterns playback

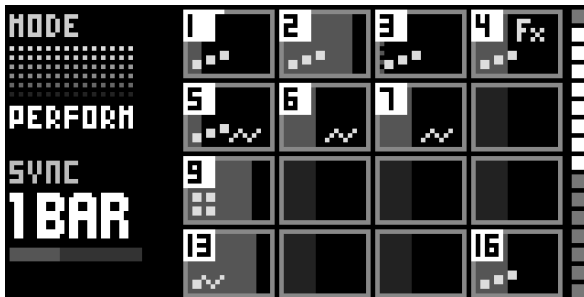
On the left screen, you can see a progress bar for the current pattern of each track, playing in concurrency. As each pattern have its own length, the progression % may be different, leading to polymeric effects.



This screen also displays the content of your tracks. In the upper example:

- Track 1, 2, 3, 4, 16 contain notes
- Track 5 contains notes and automations
- Track 6, 7 only contains automations
- Track 9 only contains drum events
- Track 13 only contains MPE notes
- Other tracks are empty (no events in any patterns)

The 16 squares on the right of the screen are indicating the 8 patterns that are currently displayed by the pad matrix. In the below, the matrix pad are showing patterns 2 to 9:



## 11.3. Launching patterns

There are 2 ways to launch patterns:

- **Press** a matrix pad to select the playing patterns of a track.
- **Press** one of the 8 **row** buttons to simultaneously launch the 16 patterns of the row.

This is the classic sequencer workflow, where one sequence = a set of 16 parameters

## 11.4. Synchronized pattern changes

In order to ensure proper musical timing in regard to pattern changes, pattern mode has a **SYNC** option. This allows you to schedule a change, for it to occur perfectly on the next beat, the next bar, or whichever time division you choose.

**Rotate** encoder ③ to set the sync division. When the sequencer is playing, a scheduled pattern led will blink, indicating that it is waiting for the next sync division to be launched.

**Tip** When using **SYNC = PTRN**, the new pattern will be launched when reaching the current one's end.

On the left screen, a bar is showing the progression % of the selected sync:



## 11.5. Muting a pattern

**NEW!** To mute a single pattern, Hold **mute** and Press a pad containing a pattern. Repeat the action to unmute it, or simply press the pad.

A muted pattern will never output any midi event, either coming from an external controller, the live mode, the step mode or midi effects.

**Tip** Selecting an empty pattern is an other easy way to cut a certain track. Please note that this method does not mute incoming messages, or messages generated by effects.

## 11.6. Editing pattern parameters

Like **step** and **automation** modes, **pattern** mode responds to single and multiple selections. You can only edit multiple patterns at once if they belong to the same track.



Hold a pad to edit a specific pattern's parameters, namely:

### **PC (LSB, MSB)**

Program change midi messages to be sent when transitioning to this pattern. Optional extended PC logic with MSB/LSB. To access extra options, Press encoder ①.

### **TRIG** **FREE** **RESTART**

"RESTART" will reset the new pattern position to its beginning after a pattern change. Default value "FREE" will keep the previous pattern position : the playhead will not jump.

**COLOR** RGB1 ... RGB8

Sets the color of the selected pattern, or group of patterns. The 8 available colors can be edited in the palette, under the MISC settings.

**LENGTH** 1 STEP ... 32 BARS

Sets the duration of the pattern, in 16th notes (steps). **Hold** and **Rotate** encoder ③ to access finer increments and odd pattern lengths.

**RUN** - REVERSE PING-PONG RANDOM BAR RANDOM BEAT RANDOM 1/16

Sets the pattern playback mode. It can be played forward, in reverse, in ping-pong, or randomly (every bar, every beat, every 16th note).

**Note** The first 4 parameters, **PC**, **TRIG**, **LENGTH** and **RUN** can also be accessed to by a **track Hold**.

**Note** The other parameters, **FOLLOW LENGTH**, **FOLLOW 1** and **FOLLOW 2** are detailed in the next section, 'Pattern follow actions'.

**Tip** Press **2ND** while making a selection to extend it to the whole column.

## 11.7. Pattern follow actions

**NEW!** By using follow actions you can automate pattern triggering and add some randomness to your patterns launches. When a follow action is set within a pattern, this pattern will apply the chosen action at the end of the pattern playback.

Each action applies within a contiguous group of patterns. For example, if the first 3 patterns have the follow action set to **NEXT**, they will cycle within this group.

In **pattern** mode, **Hold** one or multiple patterns of a track to access their parameters.



### **FOLLOW 1**

Rotate encoder ⑦ to choose a condition :

-

No follow action.

### **NEXT**

Triggers the next pattern in the group. Circles back to the first pattern if called by the last pattern of the group.

### **PREVIOUS**

Same as **NEXT**, but triggering the previous pattern in the group.

### **ANY**

Triggers any pattern within the group.

### **OTHER**

Same as **ANY**, but never retrigs the same pattern twice.

### **FIRST**

Jumps to the first pattern of the group.

### **LAST**

Jumps to the last pattern of the group.

**Tip** Hold + Rotate encoder ⑦ to set the probability of this **FOLLOW ACTION** to happen. This action will automatically balance with **FOLLOW 2** chance percentage.

### **FOLLOW 2** - **NEXT** ... **LAST**

Rotate encoder ⑧ to choose a condition. The actions are the same as in **FOLLOW 1**. Set the two **FOLLOW ACTIONS** and adjust their probabilities to create probabilistic jumps.

### **FOLL LEN** **1 STEP** ... **32 BARS**

By default, **FOLLOW ACTIONS** will be triggered at the end of a pattern (pattern length).

Rotate encoder ⑥ to set a new duration for the **FOLLOW ACTION** jumps.

Hold + Rotate encoder ⑥ to define finer increments. (steps)

**Tip** The trig mode (**FREE/RESTART**) can be used in conjunction with follow actions. For example, the default **FREE** mode allows for conditional jumps from one pattern to another without restarting them.

## 11.8. Copy, paste & delete

To copy a pattern, Hold **copy** + Press a pad.

To paste a pattern, Hold **paste** + Press a pad.

To delete a pattern, Hold **delete** + Press a pad.

**Note** It is possible to copy a pattern and paste it to a different track.

**Tip** To copy an entire row of patterns across all tracks, Hold **copy**, and Press a **row** button. Then, you can Hold **paste** and Press the destination **row** to paste those patterns.





## 12.2. Creating & launching sections

Sections and songs configuration options are displayed on the right screen of the **pattern** mode :



### Creating a section

To create a new section, first use the grid to choose the desired arrangement of patterns for the section.

Then, Rotate the main encoder and scroll to **SAVE SECTION**. You will be prompted to choose a name for the section. Once saved, the section is added in your pool of available sections.

**Note** By default, sections are named "section A", "section B", and so on.

### Launching a section

To launch a section, (recall all pattern states for the 16 tracks), Rotate the main encoder to select the section, then Press the main encoder.

**Note** Similarly to manual pattern changes, sections are launched in sync, according to the **SYNC** parameter.

## 12.3. Editing a section

Scroll to an existing section and **Hold 2ND** + **Press** the main encoder to open the section context menu, which offers the following options:

### **LAUNCH >**

Resets the song cursor to this section.

### **OVERRIDE**

Replaces the previous pattern arrangement with the current one.

### **RENAME...**

Allows to change the name of the section.

### **MOVE**

Allows to rearrange this section's position within the song.

### **DELETE**

Removes this section from the song.

## 12.4. Songs

A Song is an arrangement of previously created sections. This makes it very easy to create complex songs using sections as building blocks, for example --intro x1 --verse x2 --chorus x1 --verse x4 ...

When the pattern mode is in song mode, the song will automatically play sections in order, and schedule the next sections in advance. Any manual change performed on the grid will still occur, but will eventually be overridden by the song's next scheduled section.

To toggle between section tab and song tab, simply **Press pattern**.

## 12.5. Creating a song

First, **Press** **pattern** once to enter the song tab.

**Note** You need to create at least one section to start creating a song.

Then, to add a section, scroll to the desired position and **Press** the main encoder. You will be prompted to choose the section to add, and its desired duration at this point in the song.



**Tip** When selecting the duration, you can **Hold** and **Rotate** the main encoder for more resolution, enabling very short sections and polymeters.

**Tip** You can use the same section multiple times.

## 12.6. Playing a song

On the left screen, use encoder ① to select one of the song modes :

### **PLAY SONG**

The song will stop playback when reaching its end.

### **LOOP SONG**

The song will play in an infinite loop.

**Press** the **▶** button to start the song playback.

**Tip** When a song is playing, it is possible to set the mode to **PERFORM** : the song

playback will be paused, allowing you to do live improvisation, manual pattern changes, ... Then you can go back to **PLAY SONG** or **LOOP SONG** to continue the song playback.

## 12.7. Editing a song

Scroll to an existing section in the song and **Press** the main encoder to open the context menu :

### **LAUNCH**

Schedules this section in the song list.

### **SET TIME**

Sets the duration of the section in the song.

### **MOVE**

Allows to rearrange this section position within the song.

### **DELETE**

Deletes this section from the song.

# 13. Tracks

## 13.1. Overview

The 16 tracks of a project hold 16 patterns each. They also have a type (**POLY**, by default) and several parameters which define their input and output channels, runmodes, ...

Each project contains 16 tracks.

Press one of the 1..16 **track** buttons to select a track.

Hold a **track** button to enter the primary track settings menu:



Hold **2ND** + Press a **track** button to enter the secondary settings menu:



The active track is indicated by a bright steady white light on the corresponding pad.

## 13.2. Track settings

**OUTPUT PORT** **Midi A/B/C/D** **USB DEVICE/HOST** **CV/GATE 1/2/3/4** **CV 1/2/3/4**

**GATE 1/2/3/4**

Sets the track output.

**Tip** When possible, we recommend to use a separate MIDI output port for tracks generating a lot of events, e.g. if you send a lot of automation CC messages to a synthesizer. Moreover, as USB outputs have a higher bandwidth, you can use them to output a lot of event on different channels without compromising on timing.

**OUTPUT CHANNEL** **1** ... **16**

Sets the MIDI channel for the track output.

**Note** **DRUM** tracks will only use this channel for automations, as channels are tied to specific drum lanes.

**INPUT PORT**

Sets the MIDI port for the track input :

-

No input

**ALL ACTIVE**

Listens to all incoming events, on any port and channel, but only when the track is currently selected.

**MIDI A/B** **USB DEVICE** **USB HOST** **CV/GATE**

Listens to the specified port.

**INPUT CHANNEL**

Sets the MIDI channel for the track input :

**1** ... **16**

Listens to the specified channel

**All 1** ... **16**

Listens to any channel on the specified input port. Preferred for **MPE** or **DRUM** tracks.

**LENGTH** **1 STEP** ... **32 BARS**

Sets the length of the pattern in steps (1 step = 16th notes).

**Tip** **Hold** and **Rotate** encoder Ⓢ for finer resolution.

**RUN** - **REVERSE** **PING-PONG** **RANDOM BAR** **RANDOM BEAT** **RANDOM 1/16**

Sets the pattern playback mode. A pattern can be played normally, in reverse, in

ping-pong (forward/backward) or jump to a random step every bar, every beat or every 16th note.

### TRIG

Sets the behavior of the player upon a pattern change :

**RESTART** Resets the position to the beginning of the pattern after a change.

**FREE** Keeps the previous position of the player upon a pattern change. The playhead will not jump in this case.

### PC (LSB, MSB) 0 ... 127

Sets the program change (PC) midi message to be sent when transitioning to this pattern. You can also use optional extended PC logic with MSB/LSB (used by some synthesizer with more than 127 presets).

**Tip** Rotate encoder ⑤ to instantly set the PC, or Press encoder ⑤ to enter the menu configuring PC/MSB/LSB.

**Tip** Inside the PC menu, you will find the **PRE-SEND** option. If enabled, the program change will not be sent at the very beginning of the next-pattern-to-be-launched, but will be sent 1 quarter note before, useful when controlling Elektron machines patterns. Please note that if the new pattern has been launched by user just before the effective synced pattern change, Hapax will sent the according PC as soon as possible, so maybe the receiving Elektron device will not be able to process this PC in time.

## 13.3. Secondary track settings

Hold **2ND** + Press a track button to enter advanced settings.

### QUANTIZE - 1/64 1/32 1/24 1/16

Sets the quantization time division. Please note that this parameter will be overridden by the project quantization if set.

### STRENGTH 0% ... 100%

Sets the track quantize strength. At 100%, note positions will be shifted to land precisely on the quantization time divisions. At 0%, note positions won't be affected. At 50%, notes will only be shifted half of the duration they should have been shifted in order to be fully quantized.

### **pTRSP** OFF ON

If "pTrsp" is enabled in the project settings, this parameter will allow the current track to be transposed by track 16. This setting is disabled if pTrsp is not project enabled.

### **pSCALE** OFF ON

When set to "OFF", the track will not follow the project scale. This setting is disabled if pScale is not enabled at the project level.

### **TRACK NAME**

Allows renaming your track.

### **INSTRUMENT DEFINITION**

Shows which Instrument definition file is loaded.

Clicking on either of the two lower right encoders will open a list of the available files on the SD card, to load a new one.

Holding on either of the two lower right encoders will show the text included in the comment section of the file.

### **MIDI FILES IMPORT/EXPORT**

Import SD card midi files through the explorer, or export the active pattern to a .mid file.

## 13.4. Copy, paste, delete & swap tracks

To copy a track, Hold **copy** + Press a **track** button.

To paste a track, Hold **paste** + Press a **track** button.

To delete a track, Hold **delete** + Press a **track** button.

To swap positions of existing tracks Hold a **track** button, then Press either  or .

**Note** While the **TRANSPOSE** track is originally numbered 16, changing its position will not change its role, meaning the **TRANSPOSE** track can be at any position.

## 13.5. Instrument Definitions

### **Intro**

Instrument Definitions are a fast and easy way to setup a track to work with a given



instrument. Here is a non-exhaustive list of their features:

- Give CCs names
- Set the input and output MIDI port and channel
- Set up the drum lanes of a drum track
- Give PCs names (to save your favourite presets)
- Create empty automation lanes

Instrument Definitions are UTF-8 encoded text files, with the ".txt" file extension.

They should be stored in the HAPAX folder of the SD card, alongside the projects.

## How they work

The file is broken up into several sections, e.g. one for naming CCs, one for setting up drum lanes, etc. Each section contains keywords, known as *commands*, followed by values to set a given property.

Almost all commands are optional, and most values can be set to *not overwrite* the current state of the track with the keyword **NULL**.

**Note** This can be particularly useful to reuse an instrument definition where the channel or port might regularly change from project to project.

All text to the right of a '#' character are comments, and have no effect.

The syntax is quite simple, and self-documented in the examples below.

## Download examples

Instrument definition examples are available online on our website:

<https://squarp.net/hapax/manual/modetrack#rJmhPai>

# 13.6. Midi Import Export

## Overview

Hapax is able to import or export standard midi files. They are all stored in the MIDI folder, located in the root of the SD card, next to the HAPAX folder.

## Importing Midi Files

You can download MIDI files from the internet or export them from your favorite DAW. These files may contain notes and CC (Control Change) information.

The supported types are type 0 (1 file = 1 track) and type 1 (1 file = multiple tracks). However, we do not support type 2.

To import, navigate to **2ND** + **track**. Use Encoder ⑧ to select import (down arrow) or export (up arrow).



Select import and press the encoder to enter the "MIDI File Explorer."

After selecting a .mid file, you will be asked to select the track you want to import. Indeed, some .mid files (type 1) includes multiple tracks. Generally, each track corresponds to an instrument or an automation lane.

After confirming the import, the selected track of the selected .mid file will be imported into your current pattern.

**Note** This action will overwrite any previous notes and events present in the pattern.

**Note** When importing a .mid track longer than the maximum pattern length of Hapax (32 bars), this .mid track will be shorten to 32 bars.

## Exporting Midi Files

Press **2ND** + **track** and select the up arrow to export the current pattern as a .mid file.

The exported file is of type 1. This file will include multiple tracks: a single MIDI track for notes, and tracks for each automation lane.

This file will be named with the current project's name, the track number, and the pattern number.

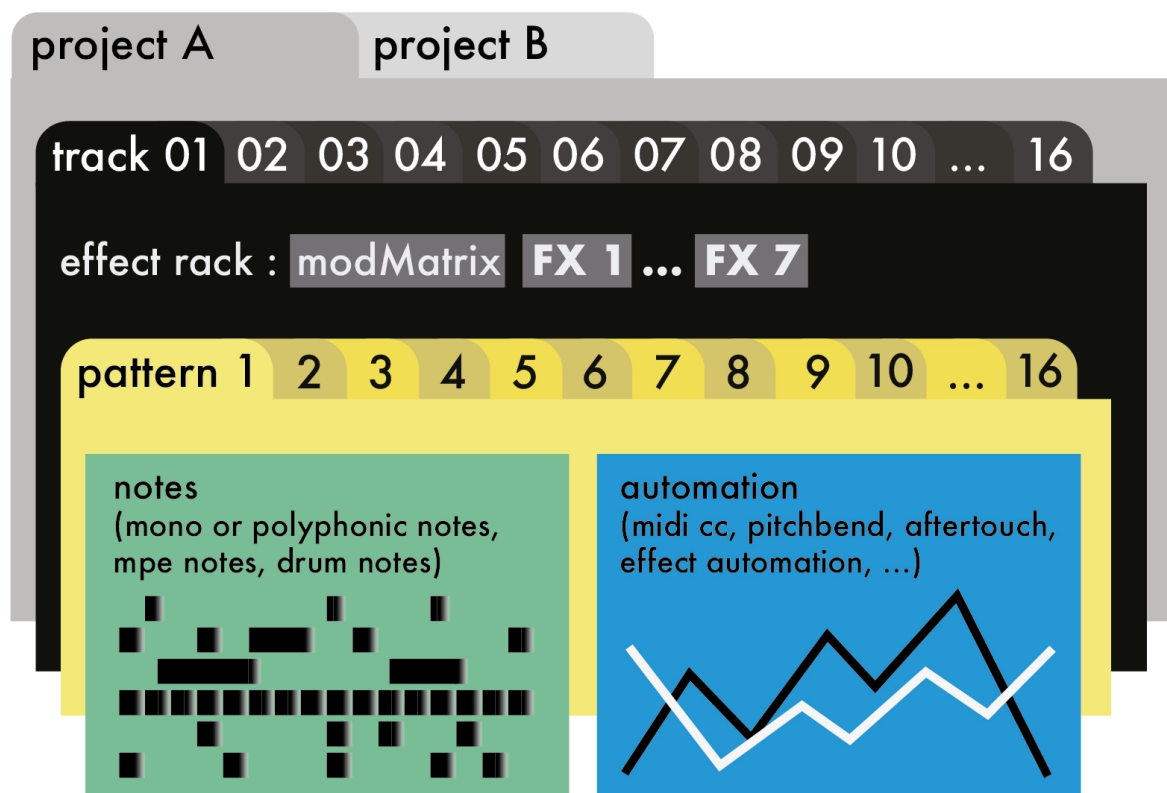
**Tip** You can use MIDI Import/Export to save and recall your own patterns at any time.

**Note** For the moment, you can't import/export MIDI files on a drum track.

# 14. Projects

## 14.1. Overview

Hapax can handle two projects simultaneously. Each project contains 16 tracks. Here is an overview of the general structure of Hapax :



**proA** and **proB** are directly accessible through their dedicated buttons. Each of them contains 16 tracks and can be played at the same time.

You can seamlessly load a project on **proA** while **proB** is running, for never ending live sets!

## 14.2. Saving, loading or creating a project

Hold **proA** or **proB** to access the **SAVE/LOAD** menu, displayed on the right screen :



**Note** The SD card must be inserted to save or load projects.

**SAVE** under the current project name, or choose a new name using **SAVE AS...** Create a new project using **NEW**, or load a previously saved project by clicking **LOAD**.

**NEW!** In the **LOAD** list, displaying your saved projects, **Hold delete** and click the encoder to delete the selected project.

**Tip** Naming a project "DEFAULT" will make it a template, automatically loaded when using **NEW**. You'll have the choice between a blank new project, one based on this template, or cancelling.

**Tip** When editing a project name, **Hold DEL** with the main encoder to erase everything at once.

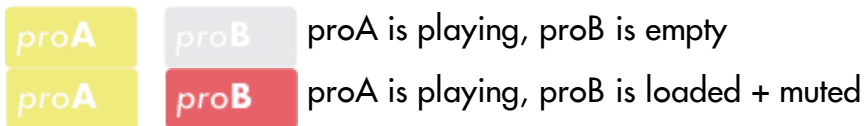
**Tip** When editing a project name, if the name is empty, select **RAND** to generate a 6-letter random project name.

## 14.3. Project transitions

Hapax is a polychronic sequencer, meaning that it can process two different projects simultaneously and independently.

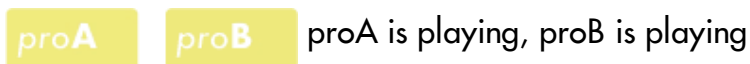
Saving, loading and mixing projects won't get you out of sync: perfect for live performances.

After loading a new project while another one is already running, the loaded project will be muted :

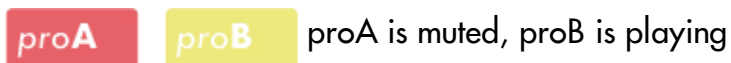


From there, arrange your muted tracks and your patterns of both projects to prepare the transition.

When you are ready to launch project B, **Hold mute** and **Press proB** : the project B will be unmuted in sync, at the end of the bar. Both projects are now playing!



When you finally need to silence all tracks of your project A : **Hold mute** and press **proA** :



You can also save proA while the other is playing, load a new project to proA to prepare a new song transition, create a new project, ...

**Note** When loading a project, if this project BPM differs from the playing project BPM, you will be asked to update the tempo (the two projects must share the same BPM for proper transitions).

**Tip** While holding mute, you can mute/unmute tracks of a project, and while keeping mute held, select the other project and mute/unmute its tracks. Thanks to the mute group feature, the mute release will toggle the mute state of your both project, at the same time. It's a great way to mix project's tracks and enhance your song transitions.

## 14.4. Setting a project scale (pScale)

One major feature of Hapax is the ability to set a global scale for each project, which will constrain all notes to the selected pScale. It provides a simpler interface without "wrong" notes. You can set a new scale anytime and in real-time, it's a great studio tool to color your song.

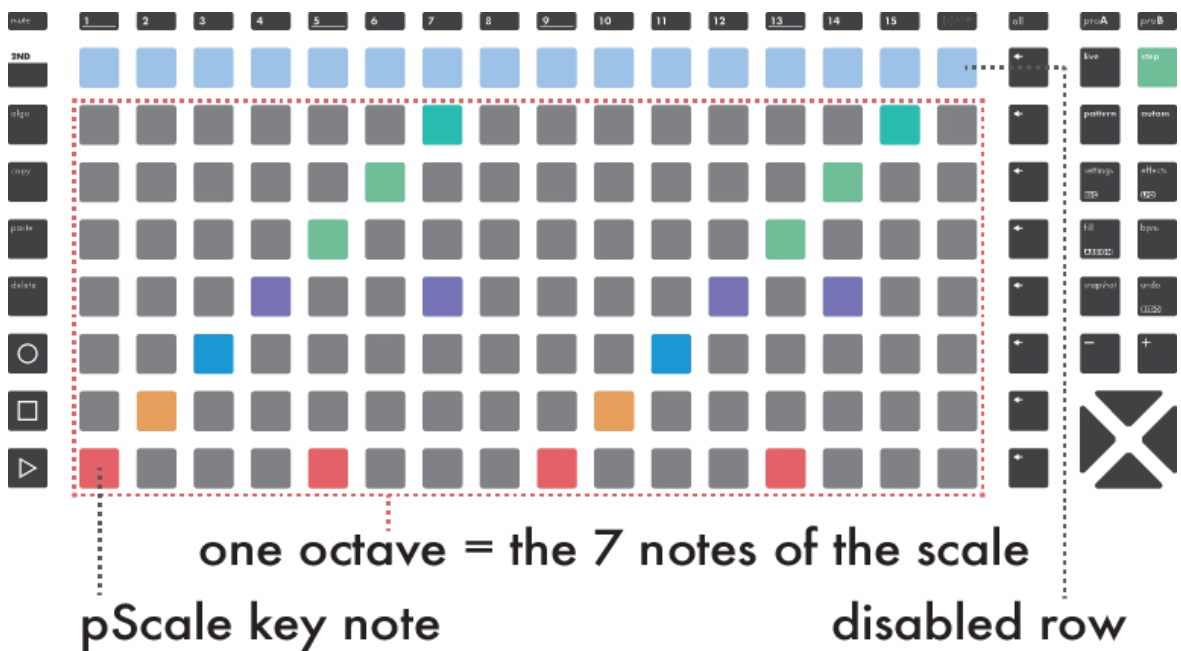
**Hold proA** or **proB** to display the selected project settings on the left screen :



When **pScale** = **ON**, the chosen scale will be applied to all the tracks that have their respective **pScale** parameters enabled (located in **2ND track**, enabled by default).

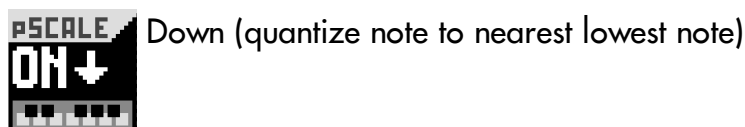
When this global **pScale** is enabled, the matrix pads only show the notes of the selected scale. There are never more than 8 notes in a scale, so the 8 rows will always show the same note.

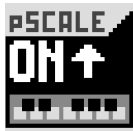
For example, if the key note of the scale is F, the bottom row will always be the F note in the selected octave.



**NEW!** With **pScale** enabled, only in-scale notes can be added with the matrix pads. The piano roll navigation is based on octave increments.

When an incoming note is out of scale, the **STICK** option determines how an out of scale incoming note will be corrected:





Up (quantize note to nearest higher note)



Filter (out of scale notes are ignored = not played)

## 14.5. Time signatures

Each project can hold its own time signature. By default, the TS is 4/4 common time, but you can easily and drastically change your songs grooves by using other signatures.

Hold **proA** or **proB** to enter project settings :



- Rotate encoder ③ (pSignature) to set the upper numeral (number of beats in one bar)
- Hold + Rotate the encoder ③ to set the lower numeral (note value that represents one beat)

### Upper numeral


When a project to 7/4, each bar is made of 7 subdivisions (7), each being a quarter note (4).

Representation on the pianoroll leds will adapt accordingly:

- One bar of 4/4 is displayed on 16 steps.
- One bar of 7/4 is displayed on 28 steps.

As 28 steps won't fit on the 16 pads of the matrix, the first part will be displayed on page 1 and will end on page 2. Page 2 will contain only 12 steps.



Now **Hold** **2ND** + **Press**  to duplicate the pattern. You will end up with 2 bars of 7/4, which is 56 steps long at default zoom level (2 x 28).

By default, each beginning of a bar is displayed on a new page. This allows for easier navigation when using uncommon time signatures.

**Note** To disable this option, set **SPLIT BARS** in *this section* of the settings.

## Lower numeral

- A common 4/4 TS means 4 beats per bar, each beat representing a quarter note.
- A 4/8 TS means 4 beats per bar, each beat representing an eighth note (quaver). Your bar will end up being twice as fast as when a common 4/4 TS is used.
- 4/2 means 4 beats per bar, each beat representing a half note. Your bar will end up being twice as slow as when a common 4/4 TS is used.

**Tip** Common Time Signatures: quadruples (4/4, 12/8), triples (3/4, 9/8), duple (2/4 - 6/8), irregulars (5/4, 7/8)

## 14.6. Transpose track (TRSP)

The transpose track is a unique track which leads the transposition of other tracks. This role is devoted to track 16.

**Hold** **proA** or **proB** to enter the project settings. **Rotate** encoder **Ⓢ** to enable track 16 as the transpose leader (track 16 will start to blink).

Notes played in track 16 will be used as reference for transposing all other tracks (1 to 15). Drum tracks are never transposed.

**Tip** You can disable the transposition on some particular tracks. This option is accessible under track's advanced settings. **Hold** **2ND** + **Press** a **track** button to enter advanced settings.

Track 16 can be used in the same way as any other track. You can play notes in live mode or with an external controller, write notes in step mode or use MIDI effects.

**Tip** If you need your transpose leader track to remain silent, you can route it to any unused output.

There are 2 different modes of pTRSP :

### TRSP - Transpose



The simplest transpose: once you play a new note in the leader track (track 16), the other track's notes will be transposed in real-time, accordingly to the track 16 note.

**Note** By default, the change is instantly applied. To enable synchronized changes, set the **pTRSP SYNC** option in *this section* of the settings.

**Tip** To change the default transpose center note (the note defining a "+0" transpose),

set the **TRANSPOSE ROOT** option in *this section* of the settings. By default, the C5 note is the note "resetting" the transpose amount.

## CHRD - Match Chord



**NEW!** Match Chord is a fun and musical feature, opening the way to live scale changes and new harmonization possibilities.

Once Match Chord is set on Track 16, it will listen for a note or a chord. Every other tracks (1 to 15) will have their own notes quantized accordingly. This allows you to transpose everything to a new scale, a new chord or even a single note and thus change your entire project harmony in real-time.

On the bottom of the right screen, you will be able to view the chromatic scale used thanks to the small piano roll (played keys are white):



**Tip** Use **HOLD** or **RELATCH** on track 16 to lock played notes when **pTRSP SYNC** is enabled for live transpositions.

**Note** When using Match Chord, note octaves have no effect. Only the chromatic scale (the set of twelve pitches, from C to B) will be used to quantize the other tracks.

**Note** By default, the change is instantly applied. To enable synchronized changes, set the **pTRSP SYNC** option in *this section* of the settings.

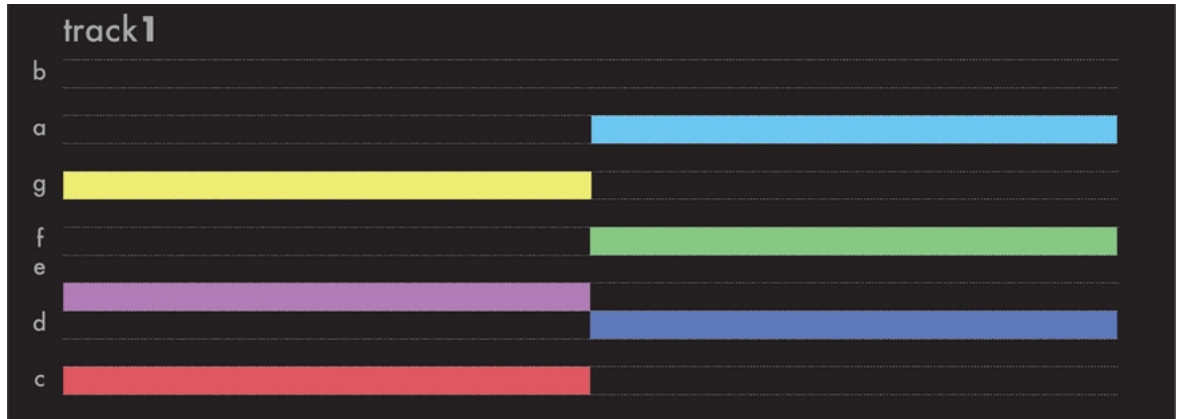
The chord needs to be held until the synchronized change has been processed. If the new played chord (or note) is released before the sync, Match Chord will be reset to the default chromatic scale. On the bottom of the right screen, a progress bar helps you to visualize the sync:



## 14.7. TRSP Transpose in practice

On track 1, let's add a simple chord progression :

**Cmin - Dmin**



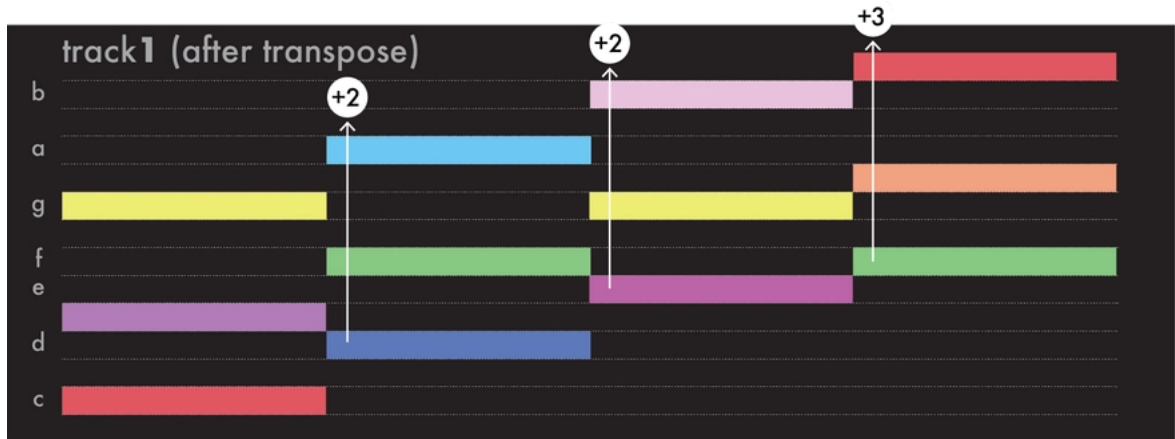
On track 16, with **pTRSP = TRANSPOSE**, let's play some notes either with the live mode keypads, with an external keyboard, or by adding notes in step mode:



Each new note will define a transposition amount. If you use the default setting (transpose root = C5), the first note in the example above won't have any effect as it is a C5, and the transposition amount will be "+0".

The second note (D) will transpose the following tracks (track 1 to 15) by "+2". The third note will transpose by "+3".

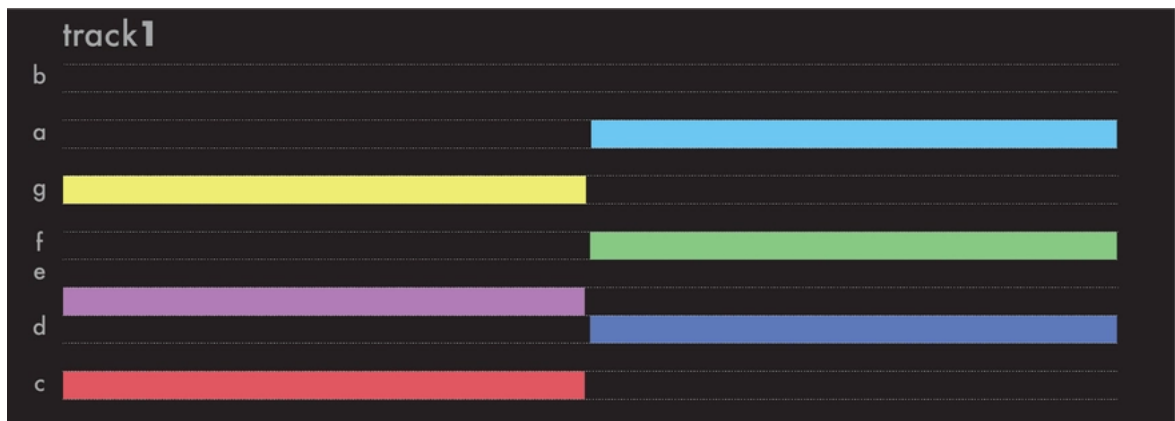
Upon playing, track 1 will therefore be transposed according to track 16 notes:



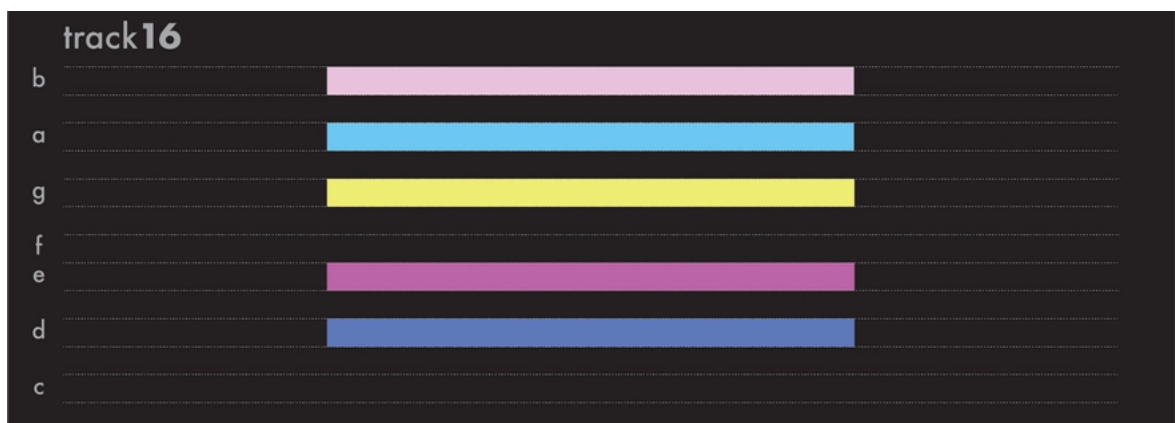
## 14.8. TRSP Match chord in practice

On track 1, let's add a simple chord progression :

**Cmin - Dmin**

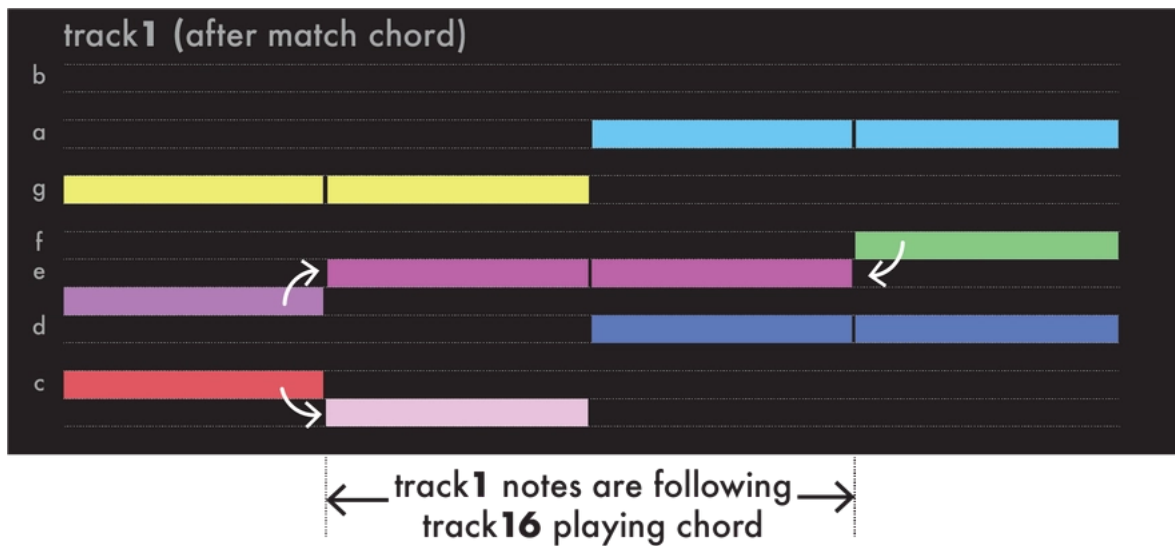


On track 16, with **pTRSP = MATCH CHORD**, let's play a chord either with the live mode keypads, with an external keyboard, or by adding notes in step mode:



This chord defines a new scale to match for every other following tracks. If an existing note from tracks 1 to 15 is equal to a note from the track 16 reference chord, it will remain unchanged. If a note differs, it will be forced to the closest note contained in the track 16 reference chord.

When running, the track 1 will therefore be harmonized to a new scale when track 16 is playing its chord:



A few other examples:

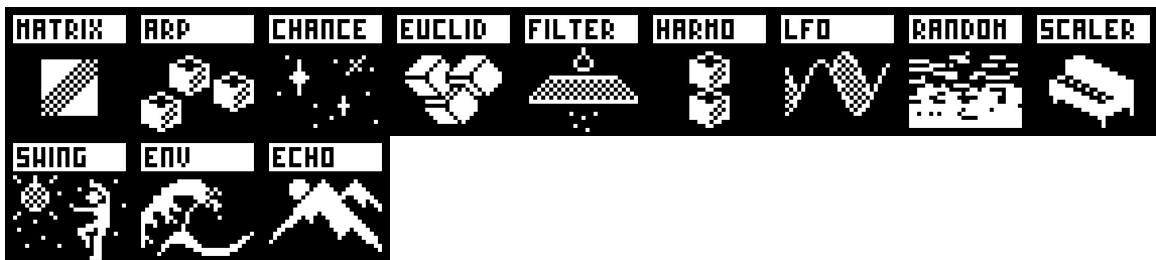
- If track 16 is playing only 1 note (e.g. C), as the other track's notes must match the track 16 chord, track 1 to 15 will only output C notes.
- If track 16 is playing the 12 chromatic notes, the other tracks notes will remain unchanged.

# 15. Effects

## 15.1. Overview

Each track can hold up to 8 real-time effects. Notes played live and recorded in a pattern are processed and sent to the outputs in real-time by the effect engines.

All the effects are **non-destructive**, and **polyphonic** capable. The position of an effect in the chain is very important: an Harmonizer placed after an Arpeggiator will not sound like an Arpeggiator placed after an Harmonizer. Experiment with the order of effects to generate eccentric melodies.



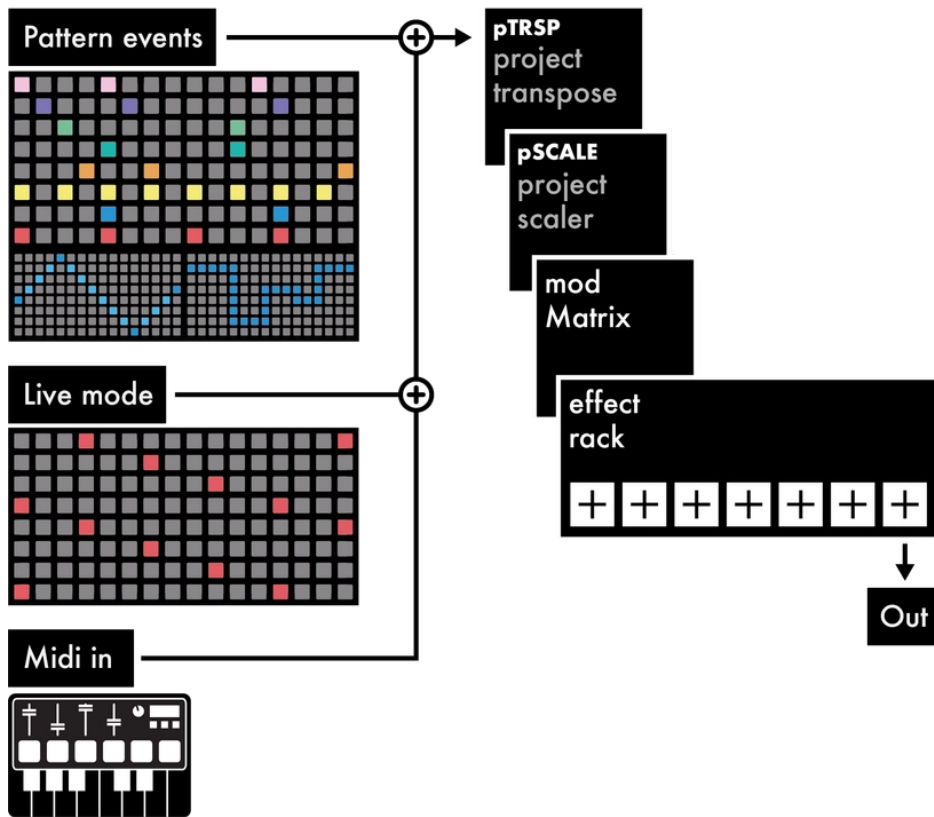
It's also possible to add multiple effects of the same engine on the same track (e.g. chaining two Arpeggiators).

Finally, every effect parameter can be edited in real-time via CC message and CV inputs, thanks to the modMatrix.

## 15.2. MIDI chain, from track input to output

The diagram below represents the routing of midi events (notes and automation) for 1 track.

Events played live are merged with recorded/programmed events, and then are processed successively by the project transpose and scaler (if enabled), the modMatrix and the midi effects.



### 15.3. Adding an effect, tweaking parameters

Press **effect**, select an empty slot and Press the menu encoder to add a new effect in the rack.



LFO effect is selected, you can play with its parameters with the 8x encoders

Use left screen and Rotate the 8x encoders to play with the selected effect parameters.

**Tip** Hold encoder param to reset the value.

### 15.4. Advanced operations



Select an effect and **Press** menu encoder to access the following options :

#### **TOGGLE ON/OFF**

Mute and unmute the effect.

#### **DELETE**

Delete the selected effect.

#### **REPLACE**

Replace the selected effect with another one.

#### **COPY**

Copy the selected effect.

#### **PASTE**

Paste the selected effect on an empty slot, or on a filled slot to replace it.

**Tip** Select an effect and **Hold** it with the menu encoder. Then you can change its position in the chain.

**Tip** **Hold** **2ND** and **Press** **mute** to toggle the effect (mute/unmute it).

## 15.5. Locking effect parameters to patterns

Effect parameter values are per-track by default, but it is possible to lock some values to the current pattern.

This way, each pattern can hold different parameter values for the same effect.

While an effect is selected and the left screen is displaying the effect parameters, **Hold** **2ND** and **Press** the associated encoder to toggle the param locking.

Below you can see an arpeggiator effect with 2 parameters locked: Octave and Repeat.



**Tip** In the context menu of an effect, **Hold 2ND** and **Press TOGGLE ON/OFF** to lock the effect mute/unmute on the selected pattern.

**ON\*** (or **OFF\*** if the effect is muted) will appear on the top of the context menu, indicating that this value is locked on this pattern.

## 15.6. ModMatrix



The modMatrix is always the first effect in the rack and can't be deleted. It allows you to patch sources (encoder ①) to destinations (encoder ⑤) in order to modulate an effect parameter (or a midi output message, or a cv output) with an incoming signal.

### SOURCES

**CC MESSAGES**

**PITCHBEND**

**AFTERTOUCH**

**CV IN**

**PROJECT LFO**

**KEYTRACKING**

Each time a note is played, takes the value of the note number. If a chord is played, takes the value of the average off all note numbers.

**VELOCITY**

Each time a note is played, takes the value of the note velocity. If a chord is played, takes the value of the average off all note velocities.

**FILL**

Reflects whether the **fill** button is pressed.

### MODULATION PARAMETERS



Encoders ③, ④, ⑦ and ⑧ are used to set the modulation parameters shown at the bottom of the screen :

### **DEPTH**

Amplifies, attenuates or inverts the input signal.

### **OFFSET**

Defines the modulation central value.

### **POLARITY**

Defines whether the modulation takes place around or above the offset value.

### **CONSUME**

Drops the input signal, or let it pass through.

## 15.7. Arpeggiator



Generates looping arpeggiated patterns from incoming notes.



**STYLE** ORDER UP DOWN UP/DOWN DOWN/UP UP+DOWN DOWN+UP  
RANDOM VELOCITY UP VELOCITY DOWN CONVERGE UP CONVERGE DOWN  
DIVERGE UP DIVERGE DOWN CONVERGE DIVERGE DIVERGE CONVERGE PINKY  
UP PINKY DOWN THUMB UP THUMB DOWN REGRESS 2 UP REGRESS 2 DOWN  
REGRESS 3 UP REGRESS 3 DOWN REGRESS 4 UP REGRESS 4 DOWN DOUBLE 1:2  
SILENCE 1:2 DOUBLE 1:3 SILENCE 1:3

Direction of the arpeggiated pattern. **ORDER** will play notes in the order they were

played. **UP** plays the pattern from the lowest note to highest. **RANDOM** will play notes in a random order.

**RATE** 1/1 ... 1/64

Speed of the pattern. A rate of **1/4** will play a note of the arpeggio every beat.

**GATE** 1% ... 200%

Pattern note lengths, depends on the rate.

**HUMAN** 0% ... 100%

Adds some randomness to the velocity and gate length.

**OCTAVE** -5 ... 0 ... +5

To create octaves progression. If **OCTAVE = 1** the arpeggiator will play the original pattern, followed by the same pattern one octave higher. If **OCTAVE = -2** the arpeggiator will play the original pattern, followed by the same pattern one octave lower, followed by the same pattern two octaves lower.

**CHORD** -2 ... +2

Plays the incoming notes as a chord, on top of the arpeggio, either up to two octaves down, or two octaves up.

**RE-TRIG** - NOTE 8BAR ... 1BAR 1/2 ... 1/16

When active, the arpeggiator will restart its sequence at the desired interval, or every added note.

**REPEAT** - x1 ... x16

If enabled, do not play the pattern in a loop, but a defined amount of cycles

## 15.8. Chance



This effect plays or does not play a note based on probability. It's a great way to

add variations to drums or melodies.



**CHANCE** 0% ... 100% **VELOCITY**

If **0%**, the note will never be played. If **50%**, the note has a fifty-fifty chance to be played. If **99%**, the note will almost always be played. If **VELOCITY** the note will have the same probability of being played as its velocity. Very handy for programming different per note probability.

**LOT** - **BAR** 1/4 1/8 1/16 1/32

When **OFF**, each note will "roll a die" to either play or not. When active, rather than evaluate each note individually, the Chance effect groups notes in time intervals, and "roll a die" for that interval. Either the full interval plays, or it does not.

**SYNC** - **BAR** 1/4 1/8 1/16 1/32

Adds a synced probability ("sync chance" parameter). If  $\text{sync} = 1/4$ , all notes that fall precisely on a quarter note will have a different probability of being played. If  $\text{sync} = 1/16$ , all sixteenth notes will have a different chance to be played...

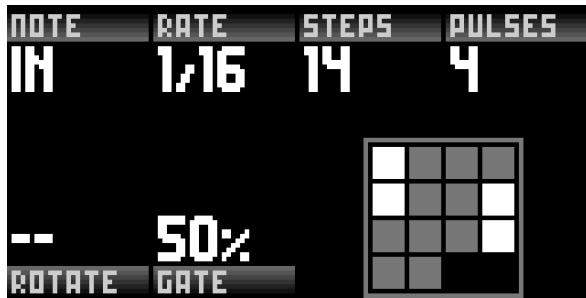
**SYNC CHANCE** 0% ... 100%

The probability of a synced note to be played. For example, if  $\text{sync} = 1/4$  and  $\text{sync chance} = 100\%$ , all beat notes will be played.

## 15.9. Euclid



Easily generate euclidean rhythms with this effect.



**NOTE** **IN** **CO (0)** ... **G 10 (127)**

When set to **IN**, Euclid will use the incoming notes, e.g. if you hold the C, E, and G notes, Euclid will play a major C chord in a euclidean rhythm. Alternatively, you can choose to ignore the input, and generate a euclidean rhythm with a fixed note, while incoming notes will be passed on to the next effect untouched. Adding multiple Euclid effects on the same rack (with different notes) is an easy way to generate complex polymeric euclidean sequences.

**RATE** **1/1** **1/2** **1/3** **1/4** **1/6** **1/8** **1/12** **1/16** **1/24** **1/32** **1/64**

Determine the clock rate of the internal euclidean sequencer.

**STEPS** **1** ... **32**

Sets the amount of steps in the full cycle.

**PULSES** **1** ... **32**

Sets the amount of pulses (filled steps) on which to play notes.

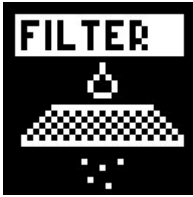
**ROTATE** **0** ... **31**

Shifts the computed rhythm.

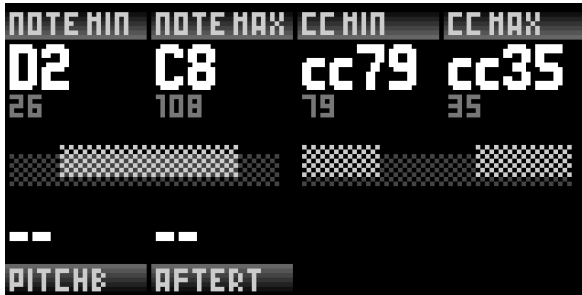
**GATE** **0%** ... **200%**

Set the gate length of outputted notes.

## 15.10. Filter



Filters out a range of notes or modulation values.



**NOTE LO / NOTE HI** **CO (0)** ... **G10 (127)**

When **NOTE LO** < **NOTE HI**, this sets the range of notes that can be let through the Filter. When **NOTE LO** > **NOTE HI** however, this sets a range of notes to ignore.

**CC LO / CC HI** **0** ... **127**

Similarly to notes, CC messages falling in certain ranges can be accepted, or dropped. When **CC LO** < **CC HI**, this sets the range of CCs that can be let through the Filter. When **CC LO** > **CC HI** however, this sets a range of CCs to ignore.

**PITCHB** **-** **DROP**

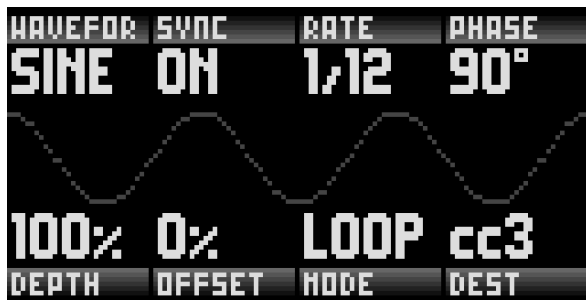
When set to **DROP**, will drop all pitchbend messages and not forward them to the next effect.

**AFTERT** **-** **DROP**

When set to **DROP**, will drop all aftertouch messages and not forward them to the next effect.







**WAVEFORM** SINE TRI RAMP SQUARE RAND

Choose the waveform of the LFO.

**SYNC** ON OFF

Choose whether the rate should be tied to the BPM of the project or not.

**RATE (unsynced)** 1 ... 100

Exponentially increasing frequency, from roughly 0.1 Hz to 1kHz.

**RATE (synced)** 64 BARS ... 1 BAR 1/2 ... 1/128

Selects the synchronized rate of the LFO.

**PHASE** -180° ... 180°

Phase shift the starting point of the LFO.

**DEPTH** -100% ... 100%

Scales the LFO.

**OFFSET** 0% ... 100%

Offsets the LFO central value.

**MODE** LOOP RLOOP ONCE 2x ... 16x

- **LOOP** : regular free running LFO
- **RLOOP** : Retrigger on every note
- **ONCE, 2X, ... 16X** : Plays once or multiple times through the waveform, then stops, like an envelope.

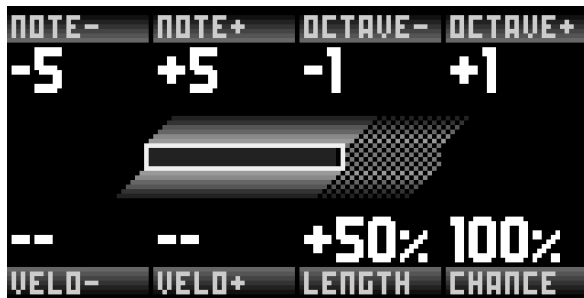
**DEST** CC PITCHBEND CV OUT ... FX PARAMETER

Destination of the LFO.

## 15.13. Randomizer



Randomly alters notes velocity/pitch/octave.



**NOTE- / NOTE+** 0 ... 12

Increase the random pitch range downwards and upwards respectively.

For example, an incoming note of 60 (C5) with **NOTE-** = 1 and **NOTE+** = 4 will be randomly assigned a pitch between 59 (B4) and 64 (E5).

**OCTAVE- / OCTAVE+** 0 ... 5

Increase the random pitch range downwards and upwards respectively. When active, notes will randomly be scaled up or down several octaves, within the selected range.

**VELO- / VELO+** 0% ... 100%

Increase the random velocity range downwards and upwards respectively.

**LENGTH** 0% ... 100%

Randomly increase the length of incoming notes by delaying their NOTE OFF messages. At **100%**, notes can be increased up to a whole note (4x 1/4 notes = a bar in 4/4).

**CHANCE** 0% ... 100%

Probability per note of random having an effect on the note parameters.

## 15.14. Scaler



Quantizes incoming notes to a given scale.



**SCALE** pSCALE MAJ ... OCTAVE

Choose the scale to quantize to. Select the **pScale** value if you want to use the scale defined into project scale.

**KEY** C ... B

Choose the root note of the scale.

**STICK** DOWN UP FILTER

When an incoming note is out of scale, the algorithm can quantize this note "down", "up" or "filter" it. For example, if selected scale is C Maj, an incoming out of scale note C# will be processed like:

- **DOWN** : C# scaled to C
- **UP** : C# scaled to D
- **FILTER** : C# is ignored (not played)

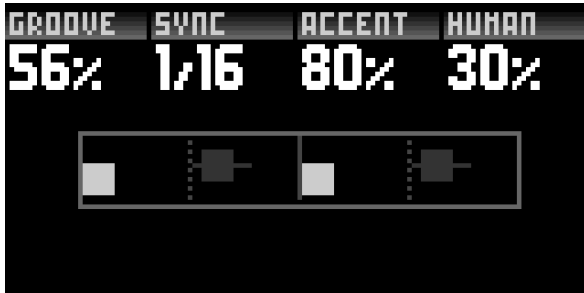
**TRSP** -36 ... +36

Transpose notes before applying selected scale.

## 15.15. Swing



Shifts the positions of incoming notes to produce rhythmic variations.



**GROOVE** 0% ... 50% ... 100%

Percentage of swing.

**50%** has no effect on notes position.

**51%** to **100%** will delay the off-grid notes position.

**49%** to **0%** will delay the on-grid notes position.

**SYNC** 1/3 1/4 1/6 1/8 1/12 1/16 1/24 1/32 1/64

Swing quantisation grid. **1/16** is the classic value.

**ACCENT** 0% ... 100%

Amount of swing velocity accent. This parameter affect all notes.

**HUMAN** 0% ... 100%

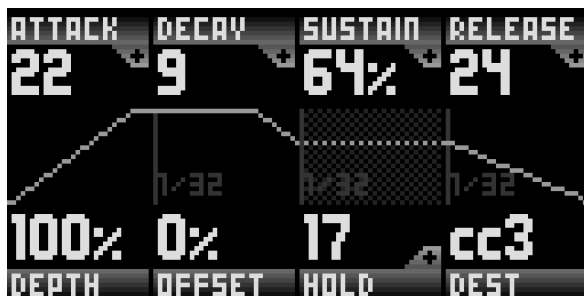
Slightly randomize the position of swung notes (humanizer).

## 15.16. Envelope



ENV is an AHDSR envelope, with variable curvature per section, which can be assigned to any destination. It is triggered every time a note comes through it.

**Tip** Click on the **ATTACK**, **DECAY** or **RELEASE** encoder to go to the corresponding hidden curve parameter!



**ATTACK** 0 ... 3072

Duration of the **ATTACK** portion of the envelope, in clock ticks.

**Note** 48 clock ticks corresponds to 1 step (1/16th note) of 4/4.

**DECAY** 0 ... 3072

Duration of the **DECAY** portion of the envelope, in clock ticks.

**SUSTAIN** 0% ... 100%

Level of the steady state (note ON), until the key is released.

**RELEASE** 0 ... 3072

Duration of the **RELEASE** portion of the envelope, in clock ticks.

**DEPTH** -100% ... 100%

Scales the envelope

**OFFSET** 0% ... 100%

Offsets the envelope central value.

**HOLD** 0 ... 3072

Duration of the HOLD portion of the envelope, in clock ticks. This section is in between the attack and the decay.

**DEST** CC PITCHBEND CV OUT ... FX PARAMETER

Destination of the envelope.

**CURVE A** -100% ... 100%

**Note** Click on **ATTACK** to access this parameter

Curvature of the **ATTACK** portion of the envelope. Positive values produce an exponential curve, while negative values produce a logarithmic curve.

**CURVE D** -100% ... 100%

**Note** Click on **DECAY** to access this parameter

Curvature of the **DECAY** portion of the envelope. Positive values produce an exponential curve, while negative values produce a logarithmic curve.

**WAIT AHD** OFF, ON

**Note** Click on **SUSTAIN** to access this parameter

When set to **OFF**, a note-off message of the sidechain note will immediately short-circuit the envelope to its release stage, regardless of the current stage.

When set to **ON**, upon receiving a note-off message of the sidechain note, the envelope will wait for completion of the Attack, Hold and Decay stages before going into the Release stage. This results in a consistent timing of the envelope regardless of the length of the sidechain note (besides the sustain stage), making this option particularly suited to trigger envelopes with short notes, or trigs.

**CURVE R** -100% ... 100%

**Note** Click on **RELEASE** to access this parameter

Curvature of the **RELEASE** portion of the envelope. Positive values produce an exponential curve, while negative values produce a logarithmic curve.

**SIDECHAIN** ALL, C0 (0) ... G10 (127)

**Note** Click on **HOLD** to access this parameter

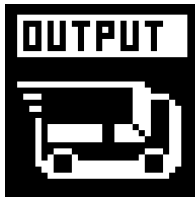
When set to **ALL** any MIDI note-on message will restart the envelope. When set to a specific note, only note-on messages of the selected note will restart the envelope.

**Tip** When the destination is set to **VELOCITY**, and the **SIDECHAIN** is set to a specific

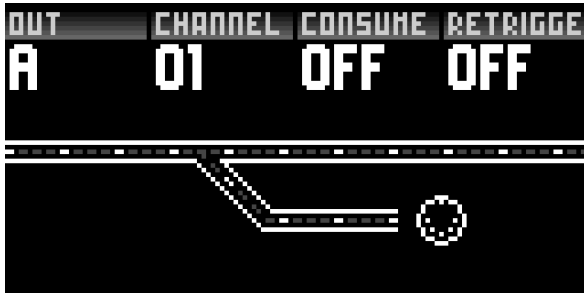
note, the sidechain note will not be affected by the envelope. A use case for this is ducking drums when the kick-drum hits, but leaving the kick drum at its full velocity.



## 15.17. Output



**NEW!** Easily reroute notes and control messages to other outputs.



**OUT** - A B C D DEVICE HOST CV/GATE 1 .. 4

Selects the secondary output.

**CHANNEL** 01 ... 16

Selects the channel of the secondary output.

**CONSUME** OFF ON

If **ON** and the parameter **OUT** is set, the effect will only send the messages to the selected secondary output. Events will not be duplicated.

**RETRIGGER** OFF ON

If **OFF**, changing **OUT** or **CHANNEL** will not retrigger held notes, allowing to stack successive held notes on multiple synths. If **ON**, then modulating **OUT** or **CHANNEL** will shut held notes on the previous output and retrigger them on the new one.

## 15.18. Echo



**NEW!** Creates copies of incoming notes, simulating an audio echo effect by using the velocity data to decrease volume.



**SYNC**  ON  OFF

Choose whether the echo rate should be tied to the BPM of the project or not.

**RATE(synced)**  1/64 ...  1/15 ...  1/7 ...  2/7 ...  2/5 ...  9/16 ...  2/3 ...  1/1

Sets the synchronized rate of repetitions. A rate of **1/4** will output an echo on every beat.

**RATE(unsynced)**  0% ...  100%

Sets the unsynchronized frequency of repetitions. A rate of **100%** will output an echo on every bar.

**REPEATS**  1 ...  63

Determines the total number of times the original note will be repeated.

**VOICES**  RELATCH  1 ...  12

Choose the total number of notes that the echo will process. When 1 voice is set, each new played note will replace the previous one in the echo buffer, so that only the last played note will be repeated. The other settings will allow for polyphonic echoes. Use the **RELATCH** value to automatically adapt the number of voices to the input : each event, whether chord or single note, will have its own voice allocation.

**VELOCITY CURVE** - LIN EXP LOG

Controls the way the echoes will fade out with a curve. Linear is a straight descending ramp, exponential and logarithmic induce more subtle variations. If no value is selected, the echoed notes will remain at the same velocity as the original note.

**GATE CURVE** - LIN EXP LOG

Similarly to the previous parameter, choose how the echoed notes lengths will be gradually shortened.

**NOTE +/-** - +/-1 ... +/-60

Set a target for the pitch of the echos. The last repetition will land on the set semitone. If the + and - notes are set, each repetition will alternate between a positive and a negative pitch until the target is reached. Use those parameters in conjunction with a SCALER effect for more melodic results!

**⊕ VELOCITY END** 1 ... 127

Note Click on **VELOCITY CURVE** to access this parameter

Sets the velocity target for the repetitions. If this value is higher than the original inputted note, the velocity of each repetition will rise until reaching the target value.

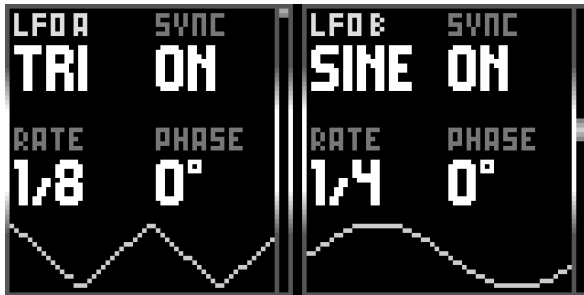
**⊕ GATE END** 1% ... 100%

Note Click on **GATE CURVE** to access this parameter

Similarly to the previous parameter, sets the note length target for the repetitions.

## 15.19. Project LFOs

Press **2ND** + **effect** to enter the Project LFOs submode.



Each project has two global LFOs that can be used across multiple tracks. They are available as sources in each track's modmatrix.

## 15.20. Quantizer



The quantizer is located in **2ND** + **track** window and aligns notes to a time division to improve timing precision.

Press **2ND** + **track** to enter secondary tracks settings.

**QUANTZ** - 1/64 1/32 1/24 1/16

Quantizer time division (usually 1/16).

**STRENGTH** 0% ... 100%

Amount of quantization. As a **100%** strength value will apply maximum quantization to the notes, lower values will allow the notes to be slightly off grid.

# 16. Algo

## 16.1. Overview

In Hapax, algo (algorithms) are operations that are *not* performed in real time, but rather applied "offline", directly on the sequences you programmed or recorded.

When working in **step** or **automation** modes, press **algo** to enter this submode.

Select the algorithm by scrolling encoder ① and **Press** it to apply the algorithm on the pattern you are working on. The other encoders let you configure the algorithm parameters.

Some parameters have a secondary value that can be accessed with a **Hold + Rotate** of the associated encoder.

**Tip** Make a selection before applying an algorithm to only alter the selected zone.

## 16.2. Generator

Availability:

**step** POLY tracks

**step** DRUM tracks



This algorithm replaces the existing notes with a new randomized pattern. Generated notes are quantized to the specified grid. The min & max pitch, velocity and length of the new notes can also be adjusted. Lastly, it is possible to set the amount of events (density %) and to decide whether the generated notes are monophonic or chords (mono ... poly 4).

**QUANTIZE** 1/1 ... 1/64

Rotate encoder ⑥ to set the grid on which the generator will place the generated notes.

**LENGTH** 1 ... 64

Rotate encoder ③ to set the maximum note length of generated notes, in steps.

Hold + Rotate encoder ③ to set the minimum note length.

**VELOCITY MIN/MAX** 0 ... 127

Rotate encoder ④ to set the maximum velocity of generated notes.

Hold + Rotate encoder ④ to set the minimum velocity.

**DENSITY** 0% ... 100%

Rotate encoder ⑦ to set the density of notes in the generated pattern.

Hold + Rotate encoder ⑦ to define the polyphony:

**Mono** Only one note can be created per time division.

**Poly 2 / 3 / 4** Enables chord generation (polyphony).

**PITCH** C0 ... G10

Rotate encoder ⑧ to set the maximum pitch of generated notes.

Hold + Rotate encoder ⑧ to set the minimum pitch.

**Note** This option can only be accessed from POLY tracks.

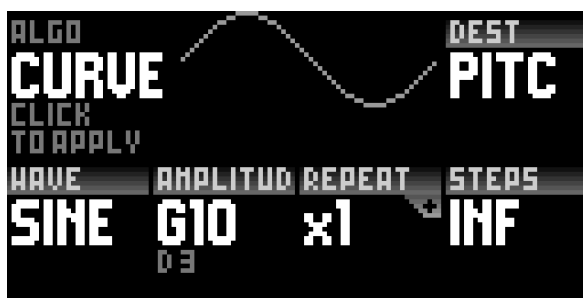
## 16.3. Curves

Availability:

**step** POLY tracks

**step** DRUM tracks

**NEW!** **automation** mode



This algorithm modifies note attributes by applying a curve on their values. The

waveform (sine, triangle...), its min & max amplitude and its rate can be adjusted. By default, the modified note attribute is the velocity, but other destinations can be set (length, chance...).

For example, a ramp applied on velocity will result in a "velocity fade in".

**WAVE** SINE TRI RAMP SQUA RAND PERLI

Rotate encoder ③ to set the waveform of the curve. The last parameters **RANDOM** and **PERLIN**, which are two types of random generators, have extra parameters that are described below.

**AMPLITUDE** Depends on destination

Rotate encoder ④ to set the upper value of the curve amplitude.

Hold + Rotate encoder ④ to set the lower value of the curve amplitude.

**DESTINATION** x1 ... x128

Rotate encoder ⑥ to set the note attribute to modulate:

**PITCH** Pitch

**VELO** Velocity

**LENG** Length

**CHAN** Chance

**ROLL** Roll

**MATH** Math condition

**UTIME** Micro timing

**REPEAT** x1 ... x128

Rotate encoder ⑦ to set the number of repetitions of the selected waveform in the selected zone.

**STEPS** INF 1 ... 256

Rotate encoder ⑧ to downsample the curve using a fixed number of steps. **INF** has the best definition, calculating new values for each steps.

⊕ **PHASE** -180° ... 0° ... +180°

**Note** Click on REPEAT to access this parameter.

Rotate encoder ⑦ to offset the curve by adjusting its phase.

**SEED** - 0 ... 9999

**Note** If **RANDOM** or **PERLIN** selected, click on STEPS to access this parameter.

**Rotate** encoder ⑧ to choose a seed for the random curve. A specific seed will always produce the same curve, that can be reused to obtain the same *controlled random* modulation.

**VALLEYS** 0 ... 100

**Note** If **PERLIN** selected, click on STEPS twice to access this parameter.

**Rotate** encoder ⑧ to adjust the level of peaks and valleys to the curve.

## 16.4. Symmetry

Availability:

**step** POLY tracks



This algorithm flips events horizontally (time) or vertically (pitch). The original events can either be kept or replaced.

**MODE** TIME PITCH

**Rotate** encoder ③ to toggle between horizontal and vertical symmetry.

**DUPLICATE** OFF ON

**Rotate** encoder ④ to enable the superposition of the generated notes onto the original notes.

## 16.5. Every N

Availability:

**step** DRUM tracks





This algorithm creates evenly spread notes with accents and ghost notes, based on the N parameter. Very powerful for sequencing drum sounds. Beware of the wild grooves you'll end up with.

**GRID** 1/1 ... 1/64

Rotate encoder ③ to adjust the grid on which the generated notes will be placed.

**N** 1 ... 16

Rotate encoder ④ to set the accent placements on the grid.

With  $N = 2$ , every second note in the pattern will be accentuated.

**ACCENT VELOCITY MIN/MAX** 0 ... 127

Rotate encoder ⑦ to adjust the maximum velocity for each accent. Hold + Rotate encoder ⑦ the minimum velocity.

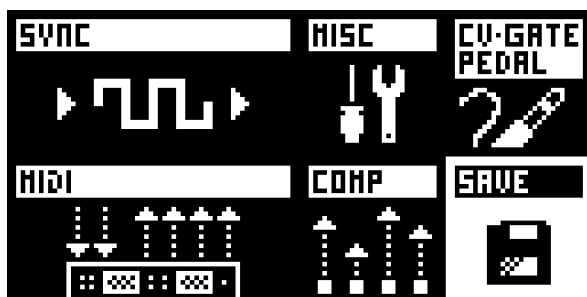
**GHOST VELOCITY MIN/MAX** 0 ... 127

Rotate encoder ⑧ to adjust the maximum velocity for each ghost note. Hold + Rotate encoder ⑧ the minimum velocity.

# 17. Settings

## 17.1. Overview

Toggle **settings** and navigate the parameters to configure Hapax according to your needs.



Select the **SAVE** icon to store settings onto the SD card : they will be loaded at startup. Settings are global and are used by both projects **proA** and **proB**.

## 17.2. Sync input

### SYNC IN



### CLOCK SOURCE

**INTERNAL** Hapax will use its internal clock (to be the synchronisation leader).

**MIDI IN A** Hapax will follow the midi A clock input.

**MIDI IN B** Hapax will follow the midi B clock input.

**USB HOST** Hapax will follow the usb host clock input.

**USB DEVICE** Hapax will follow the usb device clock input.

**CV IN 1** Hapax will follow an analog gate input, if onnected on the CV input 1.


**CV IN 2** Hapax will follows an analog gate input, if connected on the CV input 2.

**MIDI AUTO** Hapax will automatically follow an incoming clock (MIDI and USB). If no input clocks are detected, Hapax will use its internal clock.

**Tip** When using **CV IN 1** or **CV IN 2**, Hapax is synchronized in a "step advance" (trigger) style. The setting **CV CLOCK DIV** lets you choose how much ppqn the sequencer will run for one input trig. Please note that you also need to set the tempo thanks to the BPM popup, allowing a great flexibility. For example, if you want to

sync Hapax with an external eurorack sequencer analog clock, running at 140bpm and sending a gate each 1/16, you need to set **CV CLOCK DIV = 1/16 (4ppqn)** and set Hapax tempo to **140 BPM**.

### **MIDI START/STOP**

– Start and stop Hapax only with  and  pads.

**ON (CLOCK INPUT)** Hapax receives & reacts to midi in start/stop messages (on same input as **CLOCK SOURCE**, that must be set to an external source).

**ON (ANY INPUT)** Hapax receives & reacts to midi in start/stop messages. All inputs can receive these messages (even when **CLOCK SOURCE** is set to **INTERNAL**).

### **CV RESET**

**CV IN 1** Use an analog gate on CV input 1 to reset the playback position.

**CV IN 2** Use an analog gate on CV input 2 to reset the playback position.

**AUTO** If **CLOCK SOURCE = CV IN**, Hapax will automatically reset its player when not receiving an incoming CV clock for more than 2 secondes. This setting will also allow the player to automatically start the player when an incoming clock is received.

### **CV PLAY ENABLE**

**CV IN 1** Use an analog gate on CV input 1 to start the playback. A high state will run the sequencer, a low state will stop & reset the playback.

**CV IN 2** Use an analog gate on CV input 2 to start the playback. A high state will run the sequencer, a low state will stop & reset the playback.

**CV CLOCK DIV** **1/96 = 24 PPQN** **1/64 = 16 PPQN** **1/48 = 12 PPQN** **1/32 = 8 PPQN** **1/16 = 4 PPQN** **1/8 = 2 PPQN** **1/4 = 1 PPQN**

When the above option **CLOCK SOURCE = CV**, sets the expected speed of the incoming clock.

**Note** This parameter is displaying 2 different units, meaning the same thing. The first one is the time division (e.g. **1/16**) : it's the expected rate of the clock. The second one is the expected number of pulses per quarter note (e.g. **4 PPQN**).

## 17.3. Sync output

### SYNC OUT



#### MIDI A, B, C, D, USB DEVICE, USB HOST

– Do not transmit clock, start and stop messages to the selected midi output.

**CLOCK+TRANSPORT** Send midi clock + start/stop to the selected midi output.

**CLOCK** Send only midi clock to the selected midi output.

**TRANSPORT** Send only midi start/stop to the selected midi output.

#### CLOCK ON STOP

– Send midi clocks only when Hapax is playing.

**SEND** Always send midi clocks, even when hapax is stopped.

**SEND (ONLY MIDI)** Always send midi clocks on midi ports, even when hapax is stopped.

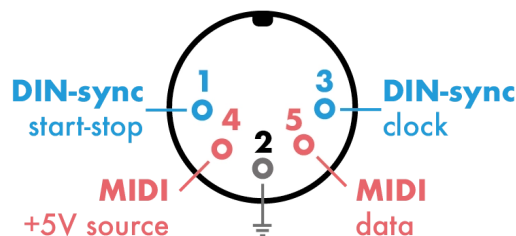
**SEND (ONLY GATE)** Always send midi clocks on gate outputs, even when hapax is stopped.

#### DIN SYNC – 1/96 ... 1/1

Set the DIN-sync analog clock pulse resolution (also known as Sync24, enable some vintage gear synchronization, like the TR-808) available on midi output C port. When a clock value is set, this DIN-sync port also send the start/stop message.

**Tip** When using Hapax DIN-sync to synchronize some units (TR-909, TR-808, ...) it may be preferable to use a special DIN-5 connector with pins 4 and 5 disconnected: these pins are used to transport midi data and may cause sync issues with some machines.

#### HAPAX DIN-5 male connector front view



#### GATE RUN – GATE 1 (RUN = HIGH) ... GATE 4 (RUN = HIGH) GATE 1 (RUN = LOW) ... GATE 4 (RUN = LOW)

When **RUN = HIGH**, selected gate output will be set to high level when Hapax is playing and low level when Hapax is stopped. When **RUN = LOW**, selected gate

output will be set to low level when Hapax is playing and high level when Hapax is stopped.

**TRIG RESET** - **GATE 1 (ON START)** ... **GATE 4 (ON START)** **GATE 1 (ON STOP)**  
... **GATE 4 (ON STOP)**

Selected gate output will trig (for a few ms) a high level signal, either at the start of playback, or at the end (on stop).

**GATE CLOCK** - **GATE 1** ... **GATE 4**

Selected gate will output a synchronisation clock, with a 50% duty cycle.

**GATE CLOCK DIV** **1/96** **1/64** **1/48** **1/32** **1/16** **1/8** **1/4** **1/2** **1/1**

When the above option **GATE CLOCK** is enabled: sets the speed/resolution of the clock.

## 17.4. Misc

### MISC



#### INFO

Display hapaxOS version and real-time CPU usage.

#### PALETTE

Enter the color palette mode, to customize RGB leds colors thanks to encoders ①...⑧ (read section color palette).

#### SCREEN

Access to screen hardware settings. These settings have been configured to reduce flickering when filming HAPAX. If you don't plan on filming, you should keep the default settings.

#### METRONOME

**MIDI** If metronome enabled in the rec settings, the metronome will be send thanks to MIDI notes messages.

**CV OUT 1/2/3/4** If metronome enabled in the rec settings, the selected CV output will output an audio sound that you can directly plug to your mixing console or portable speaker.

#### METRONOME MIDI

ACTIVE TRACK

MIDI A/B/C/D CH01..CH16

USB HOST/DEVICE

CH01..CH16

Only applicable if the previous **METRONOME** setting is set to **MIDI**. Choose which MIDI output+channel should be used to send the metronome note messages.

#### METRONOME AUDIO

VOLUME 10%

VOLUME 100%

Only applicable if the previous **METRONOME** setting is set to **AUDIO**. Choose the metronome audio output level (100% = 10Vpp = eurorack level, 30% = 3Vpp = professional line level).

#### METRONOME BAR

C0

...

C6

...

G10

MIDI note to play on the first beat of the bar.

**METRONOME BEAT** C0 ... C6 ... G10

MIDI note to play on other beats of the bar.

**TRANPOSE ROOT** C0 ... C6 ... G10

Set the "center note" defining **TRSP** = +0 (no transposition). Works only if **pTRSP=TRSP** is enable on your project.

**pTRSP SYNC** INSTANT BEAT 1 BAR ... 4 BARS

Choose the time interval on which transposition should be synced to. Works for **pTRSP=TRSP** (classic transpose) and **pTRSP=CHRD** (match chord).

**RESTART SYNC** INSTANT BEAT 1 BAR ... 4 BARS

Choose the time interval on which pressing play (when Hapax is already running) should restart the player. Useful to synchronize a restart to a beat, a bar, ... when live performing.

**LED BRIGHTNESS** 0% ... 100%

Adjust leds brightness level to best match your environment.

**SCREEN CONTRAST** 0% ... 100%

Adjust screen contrast to best match your environment.

**HOLD TIME** FASTER FAST NORMAL SLOW EXTRA SLOW

Change the time for a button press to be registered as a Hold action.

**MUTE GROUP**

**OFF** Instant track mute.

**ON** When muting tracks, enables group selection: all tracks mute states will be toggled after the mute pad release.

**SPLIT BARS**

**OFF** In **step** mode, a new bar is a continuation of the previous one.

**ON** In **step** mode, a new bar is always on a new page (useful for odd time signatures).

**Note** This is an advanced setting, default value **ON** is probably what you need.

### NOTE CHASING

**OFF** When unmuting a track, notes currently played by the playhead are not retriggered.

**ON** Retrig notes that should be playing when unmuting a track.

### SELECT +/- WARP ROTATE

Determines the behaviour of the **+** and **-** buttons during a **step** mode multiple-events selection.

### BACKGROUND RGB LIVE 0% ... 100%

Adds a colored preview of notes in the background of the 128-pad Matrix (when in **live** mode **SCALE**).

### BACKGROUND RGB STEP 0% ... 100%

Adds a colored preview of notes in the background of the piano-roll. (when in **step** mode **POLY** and **MPE**).

### MIDI MONITOR ALL MESSAGES ONLY NOTES ONLY CC ONLY PITCHBEND ONLY PRESSURE ONLY PC ONLY REAL TIME

Configure the **MIDI MONITOR** mode, in order to log all messages, or only the selected midi events.

### STEP NOTE PREVIEW OFF ON

When enabled, outputs a short note upon creating a new event in **step** mode, or modifying the pitch/velocity of an existing event.

### APPLY SUSTAIN OFF ON

When enabled, incoming sustain pedal messages (MIDI CC 64) will directly affect the note lengths. When the sustain pedal CC is high (pedal is pressed), all note-off events are held.

**Note** When this option is turned on, all inbound MIDI CC 64 messages will be consumed, and not be forwarded down the effects chain.



**Note** This does not apply to *outbound* MIDI CC 64 messages.

► [Click here for more information.](#)

### FOLLOW PLAYHEAD OFF ON

While PLAY is active and this setting is enabled, the piano-roll automatically jumps to display the currently played page.



Disable this option if you prefer to keep a manual navigation between pages, only using  or .

**AUTOLOAD** OFF ON

When enabled, the last saved project will be automatically loaded when the unit is powered on.

**SCREENSAVER TIME** NEVER 1MIN 5MIN 10MIN 30MIN 1HOUR

Determines the time to wait before starting the screensaver when no action is performed on the unit.

**DEBUG ENABLED** OFF ON

Enables debugging shortcuts for extra error messages.

**Tip** When enabled, Press **2ND** + **pattern** to save in the SD card a screenshot of the 2 OLED displays.

## 17.5. CV/Gate + pedal



**CV IN RANGE** -5.0v > +5.0v 0.0v > +5.0v -1.0v > +1.0v

Set the input voltage range Hapax can process, for the two CV inputs.

**CV OUT RANGE** -5.0v > +5.0v 0.0v > +5.0v

Set the voltage range Hapax can output, for the 4 CV outputs.

**CV OUT TYPE** 1V/OCTAVE 1.2V/OCTAVE

Each CV can be set to output the eurorack standard 1V/octave, or 1.2V/octave (e.g. when using Buchla synths).

**GATE POLARITY** HIGH=5V HIGH=0V

Set the gate ON level (5V or 0V).

**GATE OUT RETRIG** ON OFF

When a new note is played while a note was already playing, determines whether the gate is retrigged or not.

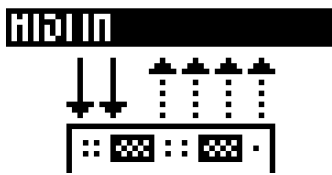
**PEDAL (TIP)** - REC PLAY/STOP PLAY/RESTART FILL UNDO REDO TAKE  
SNAPSHOT TOGGLE SNAPSHOT TRACK MUTE TRACK SOLO TRACK TOGGLE  
PREVIOUS SECTION NEXT SECTION PREVIOUS PATTERN NEXT PATTERN

Assign a command to execute when using a footswitch. Pedal hot is the tip channel of the cable, available on mono (single) and stereo (dual) pedals.

**PEDAL (RING)** - REC PLAY/STOP PLAY/RESTART FILL UNDO REDO TAKE  
SNAPSHOT TOGGLE SNAPSHOT TRACK MUTE TRACK SOLO TRACK TOGGLE  
PREVIOUS SECTION NEXT SECTION PREVIOUS PATTERN NEXT PATTERN

Assign a command to execute when using a footswitch. Pedal cold is the ring channel of the cable, available on stereo (dual) pedals.

## 17.6. Midi input



### NOTES

- Accepts all incoming midi notes
- IGNORE** Ignores all incoming midi notes
- REC ONLY** Ignores but allow record (avoid midi echo)

### CC MESSAGES

- Accepts all incoming midi CC
- IGNORE** Ignores all incoming midi CC
- REC ONLY** Ignores but allow record (avoid midi echo)

### PITCHBEND

- Accepts all incoming midi pitchbend
- IGNORE** Ignores all incoming midi pitchbend
- REC ONLY** Ignores but allow record (avoid midi echo)

### PRESSURE

- Accepts all incoming midi aftertouch
- IGNORE** Ignores all incoming midi aftertouch
- REC ONLY** Ignores but allow record (avoid midi echo)

### PROGRAM CHANGE

- Accepts all incoming midi PC
- IGNORE** Ignores all incoming midi PC

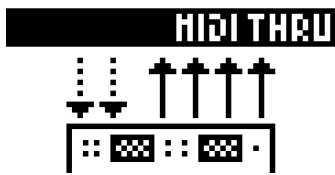
### **ACTIVE TRACK PORT** - **MIDI IN A** **MIDI IN B** **MIDI IN DEVICE** **MIDI IN HOST**

Allows for routing MIDI messages to the active track regardless of the track's input parameters.

### **ACTIVE TRACK CHANNEL** **01** ... **16**

When the previous setting "Active Track Port" is active, this sets the channel which messages should be sent to the active track.

## 17.7. Midi thru



When Midi thru is enabled, between an input and an output it forwards instantly any Midi event (including notes, Cc...) directly to the selected output.

### **MIDI IN > MIDI OUT A/B/C/D**

**ON** Configure MIDI thru from the MIDI inputs to any selected MIDI output.

### **MIDI IN > USB DEVICE/HOST**

**ON** Configure MIDI thru from the MIDI inputs to any selected MIDI output.

### **USB DEVICE > MIDI A/B/C/D**

**ON** Configure MIDI thru from the USB device input to any selected midi output.

### **USB DEVICE > USB HOST**

**ON** Configure MIDI thru from the USB device input to USB host output.

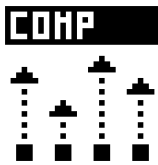
### **USB HOST > MIDI A/B/C/D**

**ON** Configure MIDI thru from the USB host input to any selected midi output.

### **USB HOST > USB DEVICE**

**ON** Configure MIDI thru from the USB host input to USB device output.

## 17.8. Compensation



Some hardware machines (MIDI or USB) and some software plug-ins may introduce latency. Hapax can compensate for these delays with the latency compensation, so all your notes and automation are dispatched and arrive with the best possible timing. Even the clocks/transport messages can be compensated separately, so your external gear will perfectly follow Hapax synchronization.

This latency compensation values are set in ms (milliseconds), and it can be negative value (midi will be sent early) or positive value (midi will be sent late). They have to be globally configured per outputs (MIDI A, MIDI B, ...) and per channels (CH01 .. CH16), as each output/channel corresponds to one of your instruments.

For example, if you are using a synthesizer introducing latency in your song (you are hearing a small delay when playing with it), set a negative compensation value on its channel/output, so the midi events will be sent earlier.

COMPENSATION	
MIDI A CH01	-13 MS
MIDI A CH02	--
MIDI A CH03	+2 MS
MIDI A CH04	-13 MS
MIDI A CH05	--
MIDI A CH06	+1 MS
MIDI A CH07	--

These compensation values are saved with the settings and will be loaded at startup, so every project will use the same settings.

**MIDI OUT A (CH01, CH02, ...)** -500MS ... -1MS - +1MS ... +500MS

Compensation per channel, for notes and automation.

**MIDI OUT A CLOCK** -500MS ... -1MS - +1MS ... +500MS

Compensation for real-time messages (not specific to a MIDI channel).

**MIDI OUT B (CH01, CH02, ...)** -500MS ... -1MS - 1MS ... +500MS

Compensation per channel, for notes and automation.

**MIDI OUT B CLOCK** -500MS ... -1MS - +1MS ... +500MS

Compensation for real-time messages (not specific to a MIDI channel).

**MIDI OUT C (CH01, CH02, ...)** -500MS ... -1MS - 1MS ... +500MS

Compensation per channel, for notes and automation.

**MIDI OUT C CLOCK** -500MS ... -1MS - +1MS ... +500MS

Compensation for real-time messages (not specific to a MIDI channel).

**MIDI OUT D (CH01, CH02, ...)** -500MS ... -1MS - 1MS ... +500MS

Compensation per channel, for notes and automation.

**MIDI OUT D CLOCK** -500MS ... -1MS - +1MS ... +500MS

Compensation for real-time messages (not specific to a MIDI channel).

**USB DEVICE (CH01, CH02, ...)** -500MS ... -1MS - 1MS ... +500MS

Compensation per channel, for notes and automation.

**USB DEVICE CLOCK** -500MS ... -1MS - +1MS ... +500MS

Compensation for real-time messages (not specific to a MIDI channel).

**USB HOST (CH01, CH02, ...)** -500MS ... -1MS - 1MS ... +500MS

Compensation per channel, for notes and automation.

**USB HOST CLOCK** -500MS ... -1MS - +1MS ... +500MS

Compensation for real-time messages (not specific to a MIDI channel).

**CV/GATE OUT (1...4)** -500MS ... -1MS - 1MS ... +500MS

Compensation for each CV/GATE output pairs, for notes and automation.

**Tip** In the TRACK HOLD menu, you can see the compensation value of the selected track when the combination of output/channel match the setting (under **CHANNEL**).

<b>P1</b>	<b>TRIG</b>	<b>OUTPUT</b>	<b>CHANNEL</b>
PC MSB LSB	<b>FREE</b>	<b>A</b> HID1	<b>01</b> -13 MS
<b>LENGTH</b>	<b>RUN</b>	<b>INPUT</b>	<b>CHANNEL</b>
<b>16</b> 18AR	→	<b>ALL</b> ACTIVE	<b>--</b>

## 17.9. Color Palette

Under **Palette** you will be able to finetune custom HSL led colors. This is very useful if you already have strong synesthetic habits.

Toggle **settings** button and enter "Settings > MISC > Palette".

You will see the colour chart on the matrix pads (a HSL color is made of 3 elements: hue, saturation and lightness).

### **Palette**

For customizing colors of Hapax RGB leds. This parameter allows you to scroll among all assignables palettes with encoder ①, and then scroll between the type of color you want to edit with encoder ⑤ :

**NOTES** Each of the 12 notes, from C to B.

**MISC** Miscellaneous colors:

- **SELECTION** : selections on the 128 pad-matrix.
- **MUTED** : muted notes.
- **VOID** : automation events of "void lane" (no destination set).
- **DISABLED** : disabled areas (loop points, out of pScale).

**DRUMS** Each of the 8 lanes, from 8 to 1.

**AUTOM** Automation colors:

- **REGULAR** : automation regular events.
- **DEFAULT** : automation default values.

**PATTERNS** RGB pattern colors from 1 to 8, used when holding a pattern and setting a custom color.

**MIXMUTE** Mixmute page colors:

- **MUTE** : mute active.
- **!MUTE** : unmuted inactive.
- **SOLO** : solo active.
- **!SOLO** : solo inactive.
- **TOGGLE** : toggle active.
- **!TOGGLE** : toggle inactive.



- **REC** : record active.
- **!REC** : record inactive.

**HUE** 1% ... 100%

Rotate encoder ③ to select the base color of the selected palette item.

**SATURATION** 1% ... 100%

Rotate encoder ④ to select the saturation of the selected palette item.

**LIGHTNESS** 1% ... 100%

Rotate encoder ⑦ to select the brightness (distance from black) of the selected palette item.

## 17.10. Midi monitor

Hold **2ND** + Toggle **live** to display the **MIDI MONITOR**, showing midi in events (left screen) and midi out events (right screen).

```
CH01 ON 78 v100
CH01 OFF 78 v0
CH01 ON 73 v100
CH01 OFF 73 v0
CH01 ON 76 v100
CH01 OFF 76 v0
```

MIDI IN

```
CH01 ON 83 v100
CH01 OFF 83 v0
CH01 ON 75 v100
CH01 OFF 75 v0
CH01 ON 71 v100
CH01 OFF 71 v0
CH01 ON 71 v100
CH01 OFF 71 v0
```

MIDI OUT

## 17.11. How to calibrate the 4 CV outputs

You can fine tune Hapax's 4 analog outputs in order to get a very precise note pitch:

Hold encoder ⑦ encoder while powering on Hapax: **CALIBRATE VOICE 1, ADJUST -4V** must appears on the screen.

With the help of an accurate voltmeter and a patch cable, measure the CV1 output and rotate the menu encoder to adjust the output voltage (-4.00V).

Click the menu encoder to select and calibrate the next voltage (-3.00V). Repeat this operation for each CV values (-2.00V, -1.00V, 0.00V, 1.00V, 2.00V, 3.00V, 4.00V).

Once you calibrated all the voltages for CV1 output, the next CV output (CV2, CV3, and finally CV4) will be automatically selected. Adjust each voltages of this selected output, always with the help of your voltmeter and by rotating the menu encoder.

At the very end of this procedure, this calibration will be saved in the SD card. Then you can reboot Hapax and start playing with your CV outputs!

**Tip** Hapax outputs -5.00V for a C0 note (midi note 0), -4.00V for a C1 note (midi note 12), -3.00V for a C2 note (midi note 24), ..., 0.00V for a C5 note (midi note 60), ..., 5.00V for a C10 note (midi note 120).

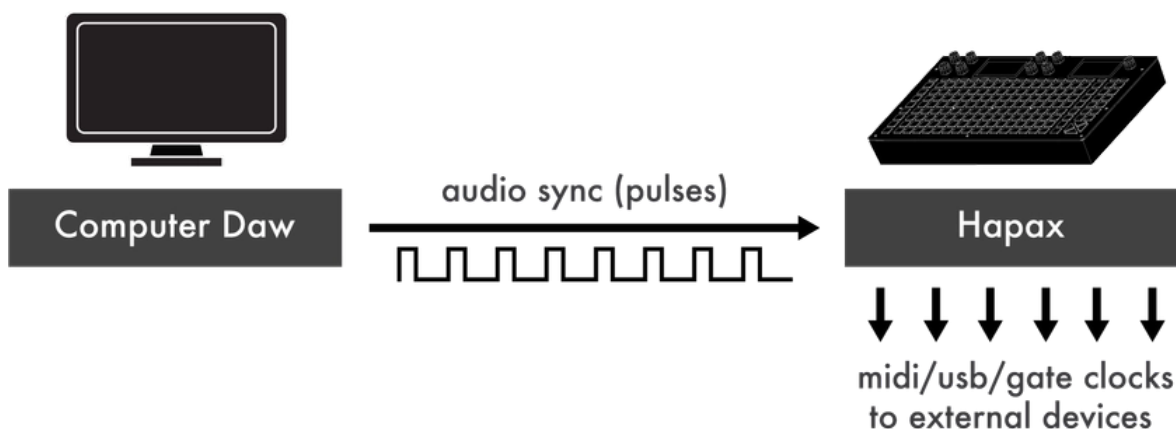
## 17.12. Audio synchronization from a DAW : enable sample-rate precision

If you need a perfect synchronization of Hapax to your computer DAW, it can be done thanks to an incoming audio signal.

Indeed, DAWs often generate jitters and delays on the computer USB midi output, due to the weak real-time architecture of computers OS.

For rock solid synchronization, it's advised to use a dedicated audio output of your computer (sending a clock output signal), if possible using a soundcard with multiple audio ports. Hapax will receive this accurate analog sync signal on one of its CV input, and will relies on it to synchronize its tempo and play/stop features.

This way, you don't have to use a "audio sync to midi" device to connect Hapax with your DAW.



How to enable audio synchronization :

- On your DAW, create a track playing (in a loop) this 1-bar 120BPM [audio file](#) (warp it so it will follow your DAW BPM)
- ... or use a synchronization plugin to generate a sync signal, like the Ableton CV Tools "CV Clock Out"
- Output this audio "clock" signal on a separated port (for example by using a soundcard)
- Make sure the volume of this output is set to maximum level
- Use an audio cable to connect the computer audio output to Hapax CV input 1

- Configure Hapax **SYNC IN > CLOCK SOURCE = CV IN 1**
- Configure Hapax **SYNC IN > CV RESET = AUTO** (so Hapax will automatically play when receiving a signal, and will stop no signal is detected)
- Configure Hapax **SYNC IN > CV CLOCK DIV (1/64** when using the audio file)
- Set the same BPM for Hapax and your DAW
- Start playing your DAW : Hapax will receive the sync signal and will immediately start to play, with zero jitter.

**Note** do not use any usb midi sync between your DAW and Hapax.

**Tip** if your computer audio output does not deliver a volume high enough to trig the Hapax input clock detection, you can configure Hapax **CV/GATE > CV IN RANGE = -1V > +1V**