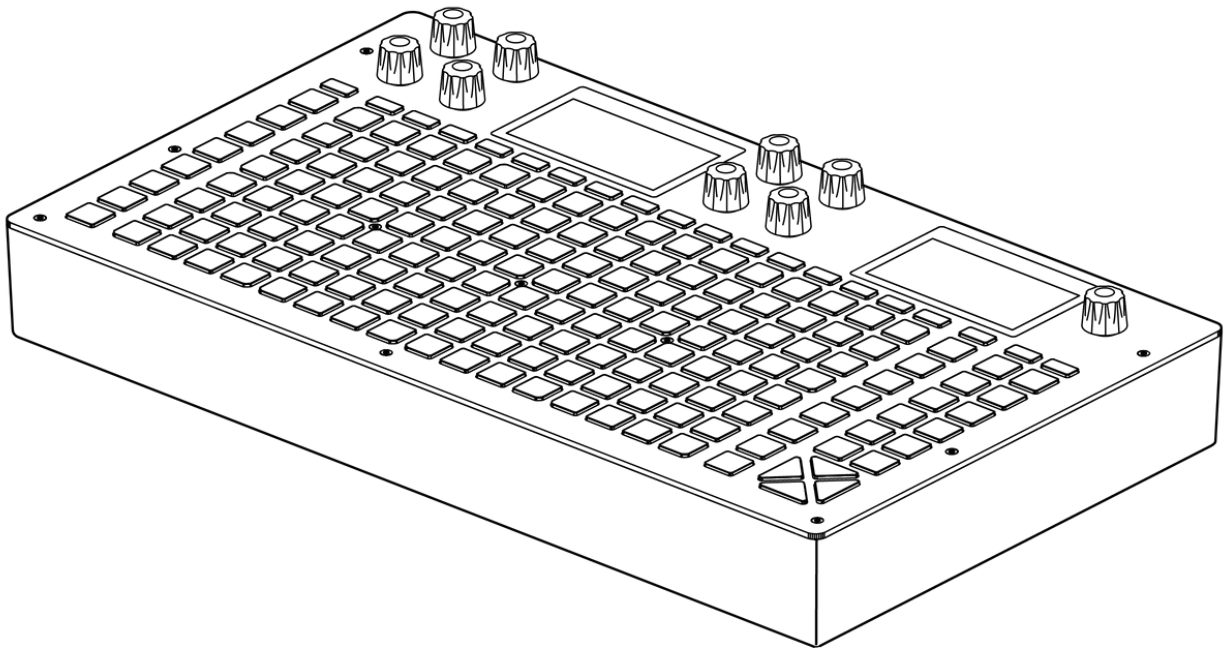
HAPAX MANUAL

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

This manual was updated on July 26, 2022.
Latest firmware at the time of writing: hapaxOS 1.10, released on July 26, 2022

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1. Getting Started

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

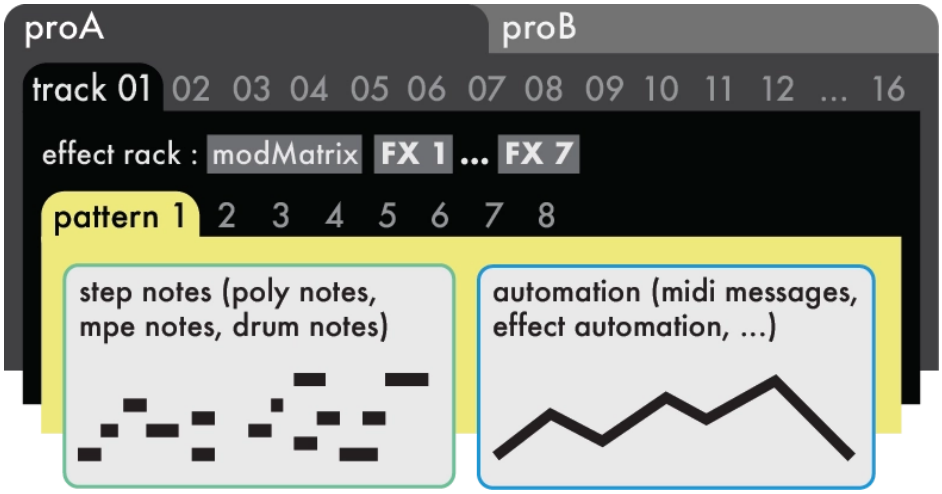
Hapax can load and play two projects (proA, proB) simultaneously. Each project has 16 tracks.

Tracks

Each track has its own inputs & outputs, its own FX rack and a set of 8 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. Working with projects

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 (left screen):

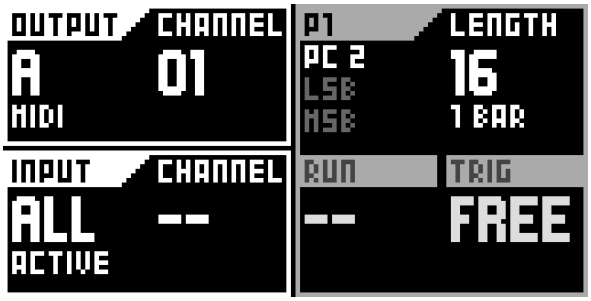
... and also enter the save/load menu (right screen):

1.4. Selecting and configuring a Track

Each project contains 16 tracks.

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

Hold **track** to enter the track settings menu : midi output, midi input, active pattern length:



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

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

1.5. Connecting a synthesizer

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

Hold the active **track** to enter Track settings menu.

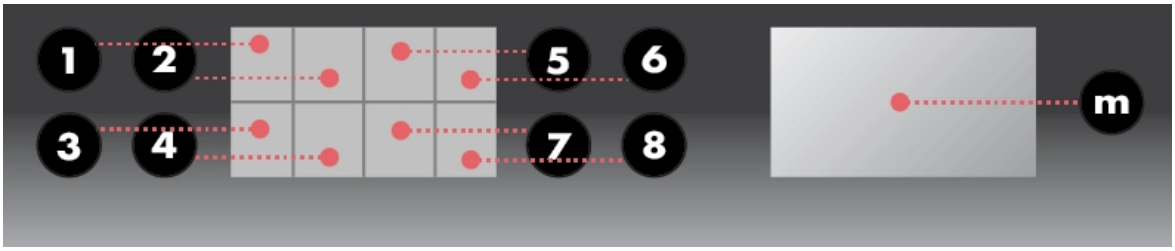
Select the output port and the output channel (factory settings : MIDI A / Channel 1).

Press **live** Mode and Play with the 128-pad matrix

Press **step** Mode and enter some steps in the piano roll, and Press play ▷ : your synth is now playing a sequence!

1.6. Tweak parameters

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

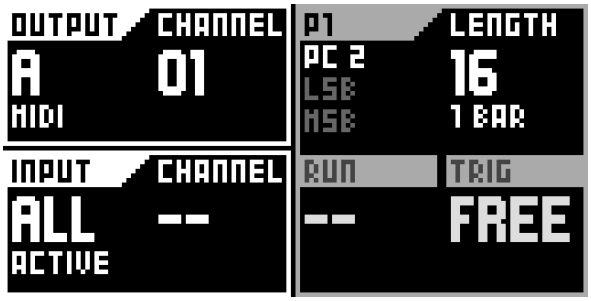


Tip Hold an encoder to reset a parameter to its default value.

Tip Hold 2ND and rotate encoders to scroll faster.

1.7. Routing midi inputs & outputs

Hold track to enter track settings :



TRACK OUTPUT

Every note of the track, whether coming from the built-in pad matrix , the sequencer or an external keyboard, will be outputed on this 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 choosen port :

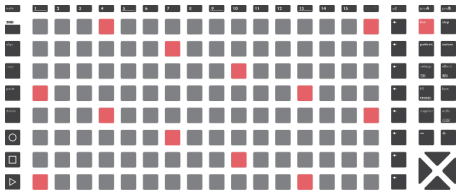
- "--" : the track isn't receiving notes from any port.
- "all active" : the track listens to all input ports, only when this track is active.

- "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.

1.8. Quick tour of the 4 modes

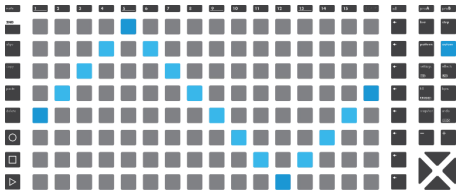
Hapax is designed around 4 main modes :

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).

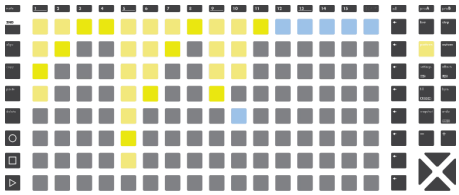


step mode : use the 128 pads to add or fine tune notes (or drum events) with surgical precision.

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.



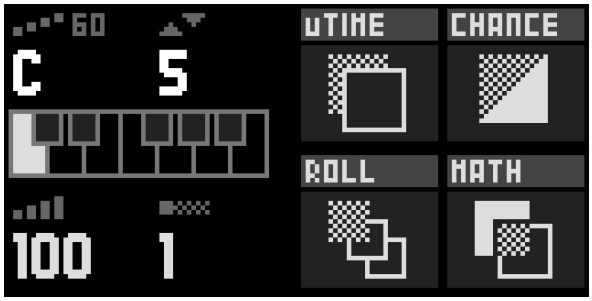
1.9. Step mode essentials

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

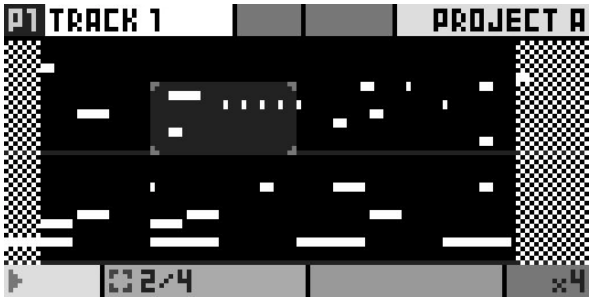
Press any matrix pad to enter a note.

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.

2. Basics

2.1. Main modes

Hapax offers four different interfaces, called modes, for playing and editing your compositions :

live
Turn the pads into a MIDI keyboard.

step
Program your melodies and rhythms and view them on the piano roll.

automation
Draw some automation lanes, to control CC messages, effect parameters or CV outputs.

pattern
Select, arrange and play your patterns.

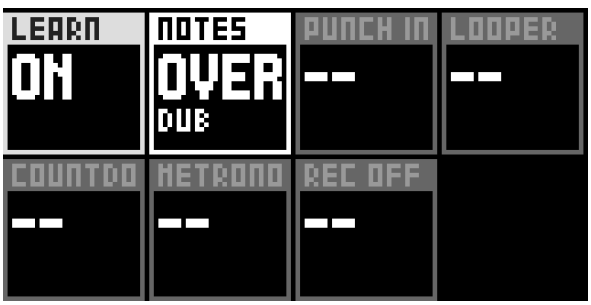
2.2. Live recording

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

- the **live** mode 128 keypads
- 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:

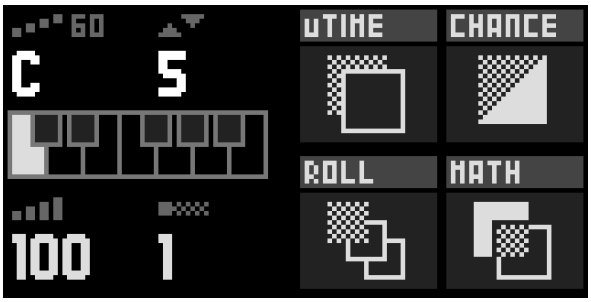


2.3. Step mode basics

Press any matrix pad to enter a note.

Press it again to delete the note.

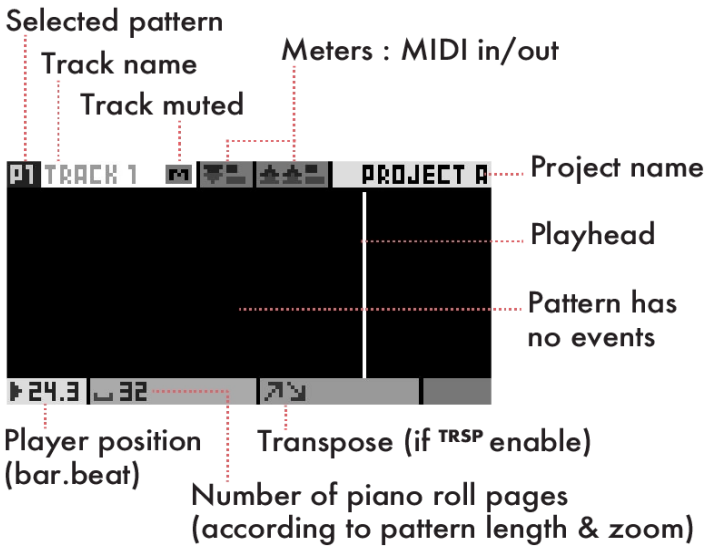
Left screen parameters contains the default values for a note. Any newly added note will inherit those values:



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.

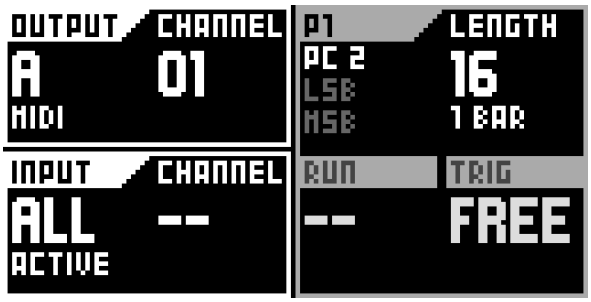
Selection: **Hold** a Step already filled with a note to finetune any parameter. You can also select multiple notes at the same time.

2.4. Upper & lower bars



2.5. 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.

2.6. 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.

Tip When you are in step mode, working with multiple pages, pressing ▷ will restart all tracks to the current page position.

2.7. 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 :

track empty (led off)
track muted (white led is waving)
track not empty (medium led brightness)
track selected (maximum led brightness)

2.8. 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.

2.9. Quantize

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

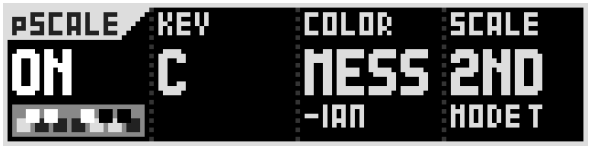
Configure the real-time quantization amount/strength of the track with encoders ① and ②, in order to soften the timing imperfections your recording, from "--" (quantize disabled) to 1/16.

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

2.10. 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 :



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

2.11. 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.

2.12. 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.

2.13. 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!

2.14. Project tempo

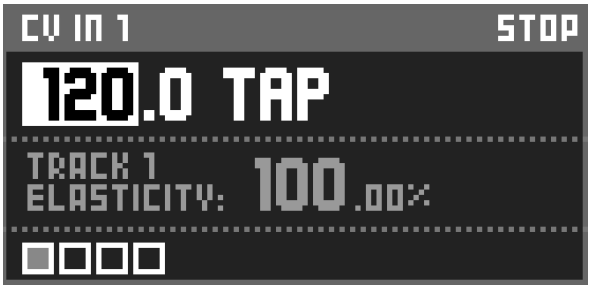
BPM

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 elasticicity 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).

2.15. 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.

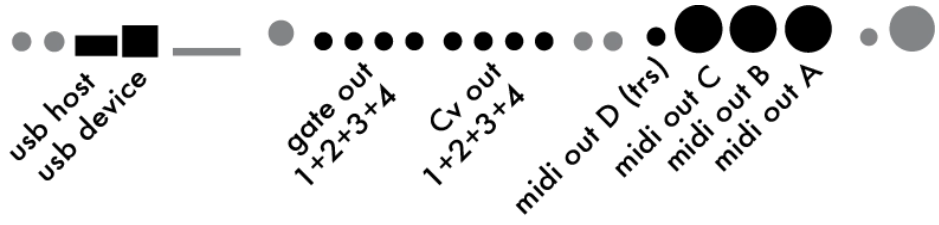
To link an external midi controller (sending midi events like notes, cc, pitch, …) to one Hapax track, **Hold** a track and select the input/channel.

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.

2.16. 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.

2.17. Data architecture

Hapax core

- BPM
- settings (sync in+out, MIDI in+thru, misc, Cv/gate)
- rec settings
- dual projects :

project A | **project B**

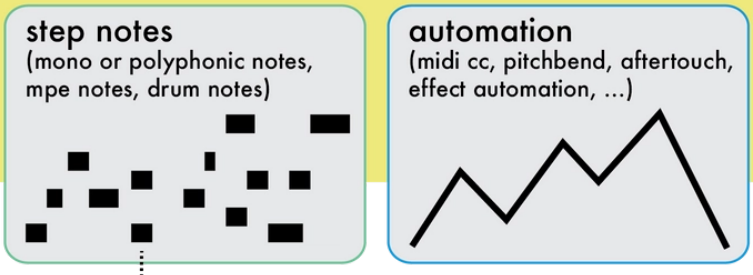
- project scale
- project time signature
- track mutes
- playing patterns, sections, song
- pattern mode (performance, song play, song loop) + pattern sync
- **TRSP** enable (track 16 tranposes other tracks)
- set of 16 tracks :

track 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | ... | 16

- track type (poly notes / mpe notes / drum)
- input (MIDI A, B, USB device, host, Cv/gate) + channel
- output (MIDI A, B, C, D, USB device, host, Cv/gate) + channel
- elasticity (50% ... 200%)
- fx rack : modMatrix + up to 7 effects
- quantize + strength
- set of 8 patterns :

pattern 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8

- pattern length (1 step ... 32 bars)
- run mode (normal, reverse, ping-pong, random)
- trig mode (free, restart)
- program change (PC, MSB, LSB)
- zoom
- loop points
- effect parameters lock
- events :



each event includes its own set of note parameters:
velocity on + off, note length, utime, chance, roll, math, mute

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

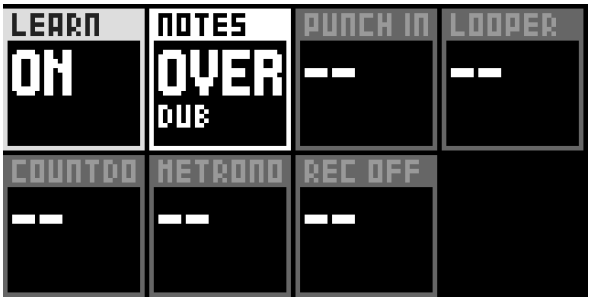
On drum tracks, play your drum kit with the pads, divided in 8 zones of 16th velocities.
A simple **Press** on the **live** button will lead you to the livemode drum.

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 ● (and ▷ 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.

Recording settings can be accessed through the REC menu.
Press **2ND** + **settings** to enter this menu.



LEARN ON OFF
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 ON OFF
When enabled, Hapax will play a countdown before the recording starts. The track must be armed beforehand with a Press on rec ●.

METRONOME ON OFF
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 ON OFF
Press ● to arm your track. If punch-in is enabled, Hapax will wait for the first incoming note to automatically start recording.

LOOPER **AUTO LENGTH** **OFF**
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 ⏺ to start recording a loop.
Press rec ⏺ 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 **END PATTERN** **OFF**
If enabled, this parameter will allow the recoring 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.

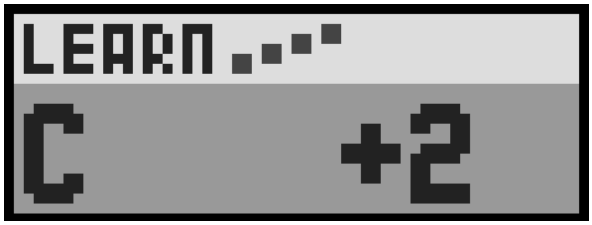
Rotate encoder ② to set the strength value of quantization.
While 100% strength value will apply maximum quantization to the notes, lower values will allow the notes to be slightly off grid.
Tweak this parameter to taste to find the balance between straight and swung feel in your tracks.

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.

Click encoder ② to enable the LEARN edit:



To exit the LEARN edit, click encoder ① or ②.

Tip **Press** **2ND** + **settings** and **Rotate** encoder ① to completely disable midi LEARN.

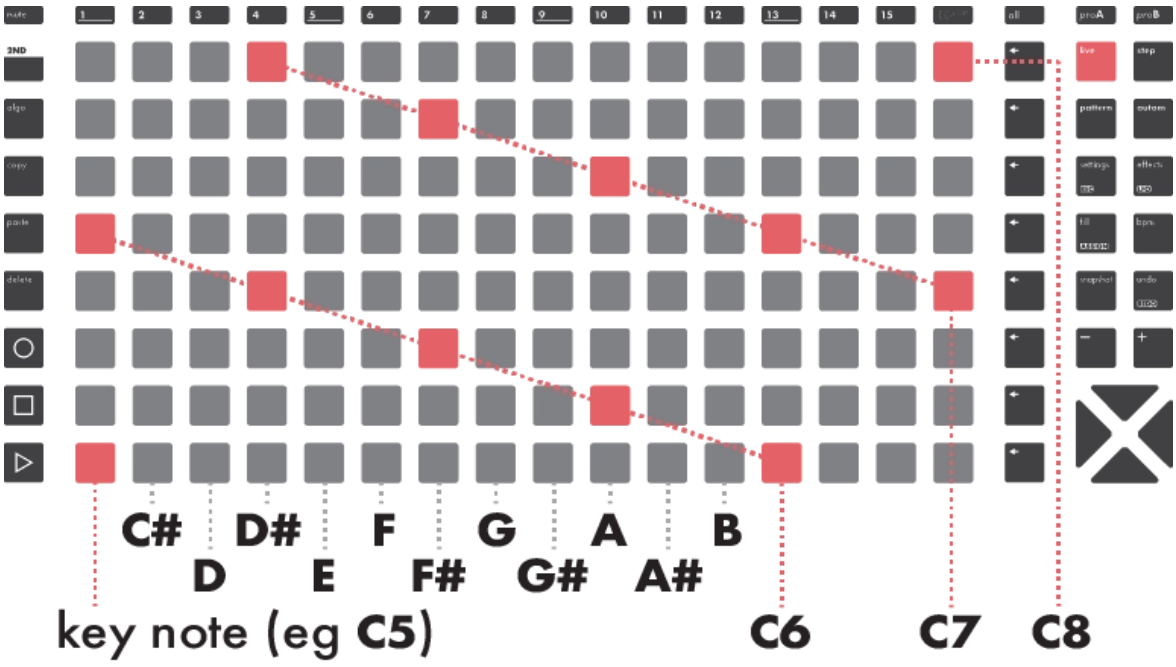
4. Livemode Scale

4.1. Overview

In this mode, the pad matrix ▪ are forming 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 row jump.

Rotate encoder ⑤ to change the scale color.

Rotate encoder ⑥ to change the scale type.

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 :

- None / Chromatic
- Major
- Minor
- Dominant
- Suspended
- Half-Diminished
- Diminished
- Messian
- Intervals

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

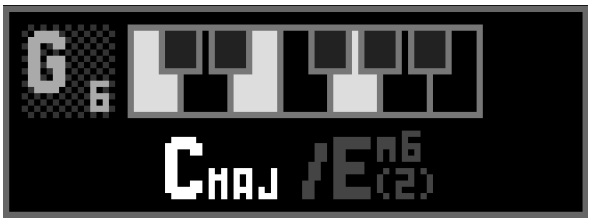
The held notes will be replaced by any new input of notes.

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, when you play (C - E - G), Hapax recognizes a Cmaj, as well as a second chord name : Em6 in second inversion:



Here are the conventions used for chord naming :

Major Chords
Minor Chords
Half-Diminished Chords
Diminished Chords
Suspended Chords
Polychords

5. Livemode Chord

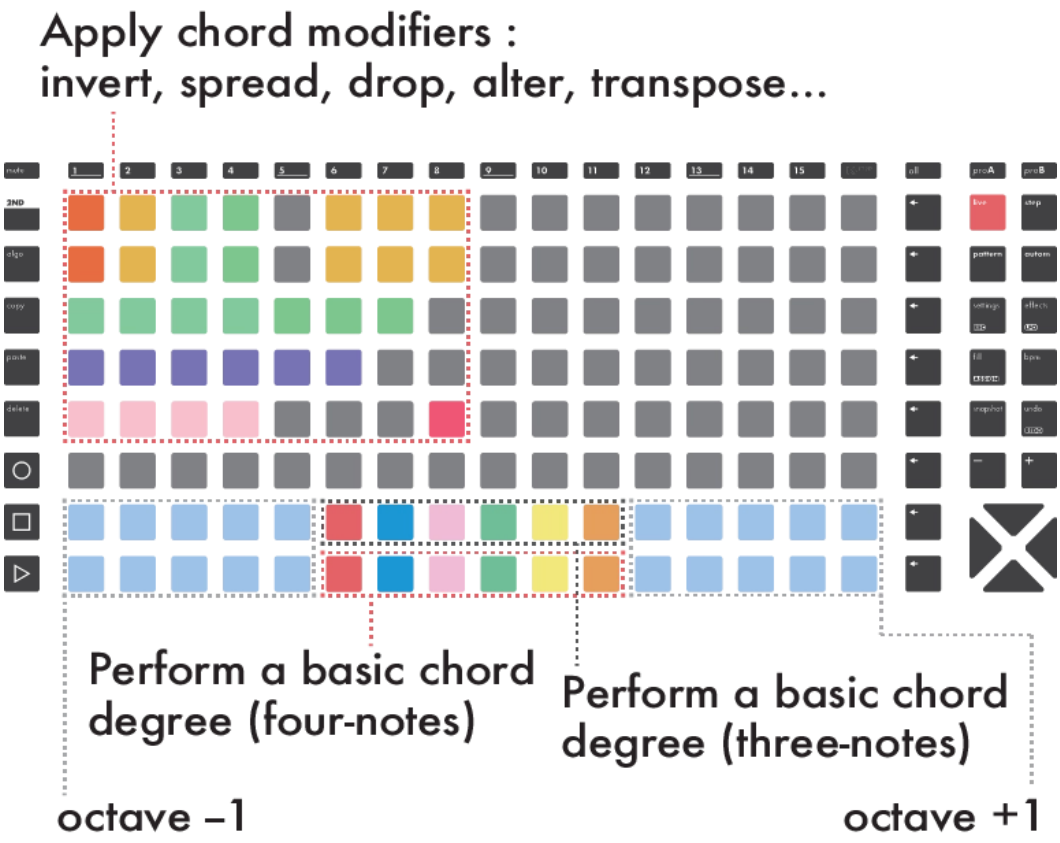
5.1. Overview

This mode gives you access to a large variety of chords, harmonized to the currently selected scale, and can be used to generate complex harmonies for your tracks.

The interface is meant to be played with both hands. The left side is focused on inversion, spread, drop, alter, and general enrichments. The right side is where the basic degrees of the chord are played.

Although it is based on musical theory, no particular knowledge is required for using this mode. It has been designed to quickly try and listen chords until you find something you like.

The pad matrix is divided into two main areas :



RIGHT HAND

Press some of the bottom pads to input your initial chord.

LEFT HAND

Press a pad of the left part of the pad matrix. A modifier will be added to the modifiers list. You can stack up to 8 modifiers per track to enrich and perfect your chord.

5.2. Right hand (chord generator)

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

Rotate the scale encoder to change the selected scale. If pScale in enabled, pScale will be used in this mode.

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.

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

Major scale example

Harmonizing a scale is done by stacking thirds of a scale.
C Major Scale harmonisation leads to those chord degrees :

Maj7, min7, min7, Maj7, Dom7, min7, half-dim.

5.3. Left hand (voicing)

The chords that are generated by pressing the bottom pads are in their common root position.
If you want to spice things up, it's time to add some modifiers. You can stack up to 8 modifiers for a chord. Their order in the list have an influence on the processing order, and thus on the output.

Press a modifier pad to momentarily add a modifier to the list.

Hold **2ND** and **Press** a modifier pad to add/remove it from the list.

The different modifier descriptions are listed below :

Octave

- Octave +/-1: Every note is raised/lowered by one octave.
- Octave +/-2: Every note is raised/lowered by two octave.

Spread

Spreads the chord notes across octaves. Spreaded chords have a very pleasant sound, especially if they are complex chords.

- Spread up: raises one chord tone out of two.
  Spread up ++ to raise it more.
- Spread down: lowers one chord tone out of two.
  Spread down -- to lower it more.

Rotate

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

Voicings

Voicings refers to the placement of the notes in the chord structure. How a musician will rotate, spread and double notes.

- Spread up & down: applies spread up and spread down at the same time
- Wider Interval Down: rotate chord until wider interval is in the lowest part of the chord.
- Quartal voicing: no thirds, only fourth.

Extended chord qualities

- power chord: root & fifth only.
- sus2: 3rd is replaced by a 2nd.
- sus4: 5th is replaced by 4th.
- add 6th: 7th is replaced by 6th.
- add 6/9: 7th is replaced by 6th and 9th added.
- Kenny Barron (11): add 9th & 11th. Mostly used on minor chords

---

Bass (Drop)

Lowers (one octave) one of the chord tones.

- bass root: drop the root note.
- bass third: drop the third.
- bass fifth: drop the fifth.
- bass seventh: drop the seventh.

Transpose

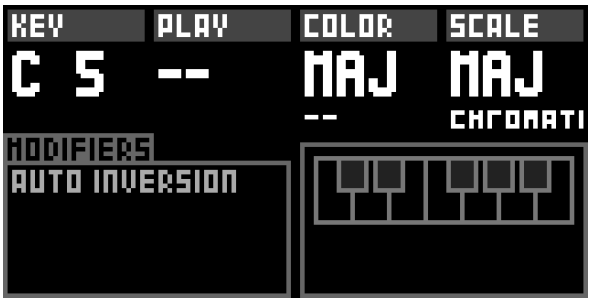
Transpose by semitones all chord tones at once.

- transpose +1/+2/+3/+4: transpose semitones up
- transpose +5: is equivalent to a perfect fourth up
- transpose +7: is equivalent to a perfect fifth up

5.4. Auto inversion

It's purpose is to enable a well known pianist skill. From one chord to another, move as few fingers as possible.

Auto inversion is listed as a modifier: enable it by pressing the red modifier pad.



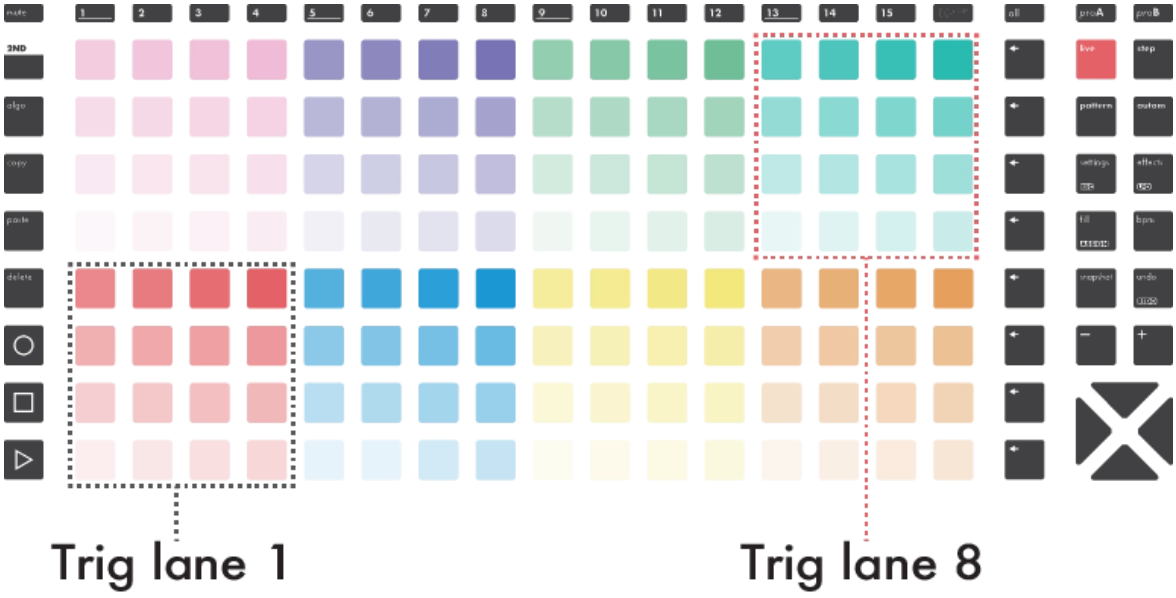
6. Livemode Drum

6.1. Overview

Drum tracks are specially intended for drum machines, grooveboxes and samplers. In livemode drum, the pad matrix is divided in 8 zones, corresponding to the 8 drum lanes of the track.

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

Then, **Press** **live** to enter the livemode drum.



Pressing a pad will trigger a 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/gate number.

Tip for a more in-depth configuration of drum lanes, you can have a look at the chapter about stepmode drum.

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 — the **step** mode allows you to "program" sequenced events directly into the current track. **step** mode is a great way to get the best out of your synthesizers and drum machines.

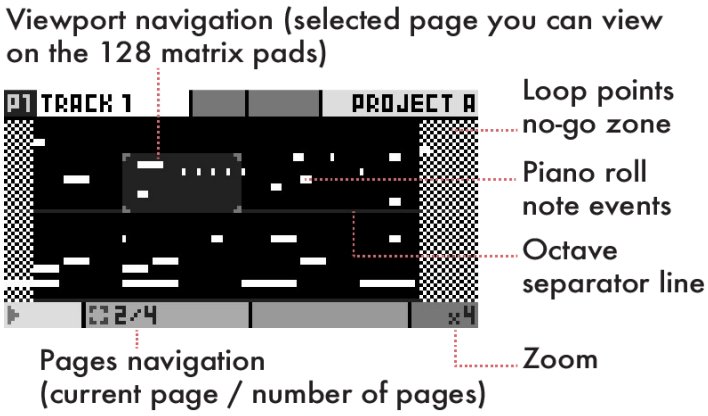
Hapax a 128 pad matrix to program your step-by-step rhythms and melodies effortlessly and efficiently. You are free to extend the length of your track up to 32 bars. In conjunction with extreme zooms, conditional trigs, chance, loop points, selection, scale folding, run modes, possibilities are endless!

The **step** mode also allows you to edit a previously recorded live performance, using the piano roll view.

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

7.2. Piano roll overview

The piano roll displays the full length of the current pattern on the right screen. The grayed out area, called viewport, displays the portion of the page that is shown on the pad matrix :



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

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

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

7.3. Basic operations

Press a pad of the matrix to add a note.

Rotate encoder ① to set the lower-left note of the pad matrix. You can also use the main encoder (or **Hold** **2ND** + 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.

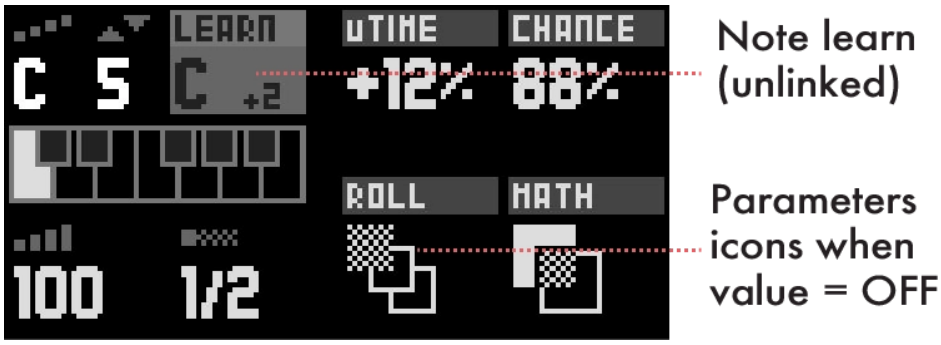
Tip **Hold** **2ND** + or to double or halve the length of the pattern.

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.

7.4. Note parameters

Each note event includes its own set of 8 parameters : Note & Octave, Velocity, Length, µTime, Chance, Roll, Math.
Step parameters are visible on the left screen. Each one of them is connected to its own encoder :



To modify the parameters of a pad or a selection of pads, **Hold** the pad or the zone.

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.

uTIME -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 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
- ON=0 — plays only if no other notes are played
- LB<5 — plays if last beat played less than 5 notes

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 +/-".

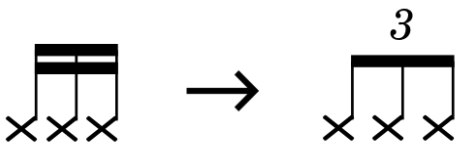
WARPING

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 +.

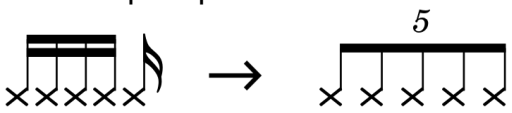
The three events now span four 16th notes, and are still regularly spaced, which results in triplets.



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 zoom, pattern length and navigation

LENGTH

Each of the 8 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 ⑥. You can Hold + Rotate encoder ⑥ 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 grayed out area on the pianoroll 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.

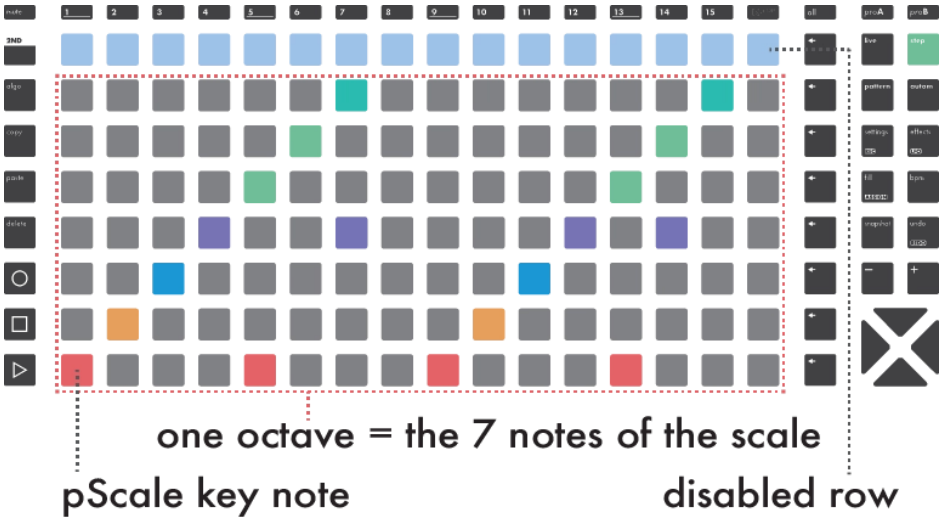
Hold |◀ and **Press** one of the 1…16 **track** buttons to set your loop point end.

Press both ▶| + |◀ to remove the loop points.

7.8. Project scale (pScale)

Hold **proA** or **proB** to enter the project settings.
Rotate pScale param to ON to enable pScale on this project.

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.

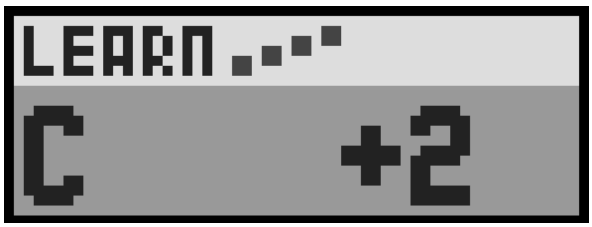
Once pScale is enabled, only in-scale notes can be added with the matrix pads. The vertical navigation in the pianoroll is now octave by octave. This simpler interface garantees that no out-of-scale note can be added anymore.

Tip After setting the project pScale, you can enable it for individual tracks in their secondary setting window.

7.9. Note learn

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.

Click encoder ② to enable the LEARN edit:



To exit the LEARN edit, click encoder ① or ②.

Tip **Press** **2ND** + **settings** and **Rotate** encoder ① to completely disable midi 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.
- PREV: note plays if last condition was valid (project level).
- /PREV: note plays if last condition was not valid.

The condition PREV is based on a project level.

SYNC

- SYNC: note plays if added on 1st step of a beat.

- /SYNC: note plays if not added on 1st step of a beat.

ONS

- ON=0: note plays only if no other notes are played.
- ON<2: note plays if less than 2 notes are played.
- ON<3: note plays if less than 3 notes are played.
- ON<4: note plays if less than 4 notes are played.
- ON<5: note plays if less than 5 notes are played.

These conditions are based on a project level.

LAST STEP / LAST BEAT

- LS=0: note plays if last step played zero notes.
- LS<2: note plays if last step played less than 2 notes.
- LS<3: note plays if last step played less than 3 notes.
- LS<4: note plays if last step played less than 4 notes.
- LS<5: note plays if last step played less than 5 notes.
- LB=0: note plays if last beat played zero notes.
- LB<2: note plays if last beat played less than 2 notes.
- LB<3: note plays if last beat played less than 3 notes.
- LB<4: note plays if last beat played less than 4 notes.
- LB<5: note plays if last beat played less than 5 notes.

These conditions are based on a project level.

ONE IN...

- 1:2... x:y ... 1:16 : play the note x time each y loops
- /1:2... /x:y ... /1:16 : does not play the note x time each y loops

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

8. MPE Tracks

8.1. Overview

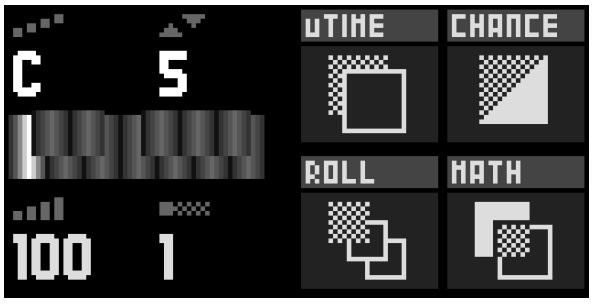
MPE, or Midi Polyphonic Expression, is a recent specification of musical instruments data exchanges, based on MIDI.
It allows to play a synthesizer in an expressive, articulated way, that approaches the sound and feel of acoustic instruments. Hapax can record MPE controllers, with which you can simultaneously modulate several parameters on distinct notes, like timbre, tonality, pressure or volume.

In HapaxOS V1.0, the MPE and poly track types are very similar.

8.2. Recording and editing

Recording a track using an MPE controler is the same process as described in the "Record your performance" Live section of this manual.

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.

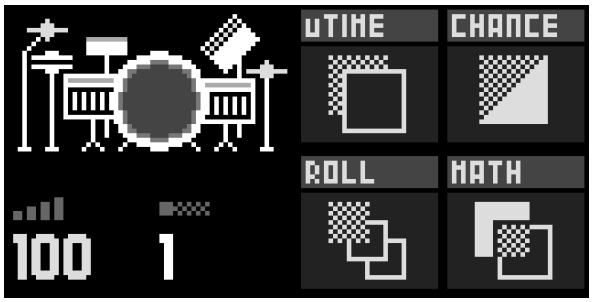


HapaxOS is evolving and will soon allow editing on expressive parameters for each note of an MPE track.

9. Drum Tracks

9.1. Overview

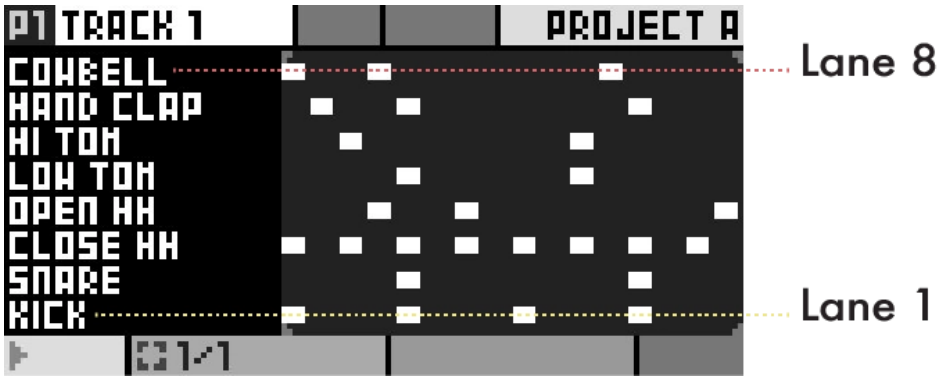
The drum track type is particularly suited for drum machines, grooveboxes and samplers.

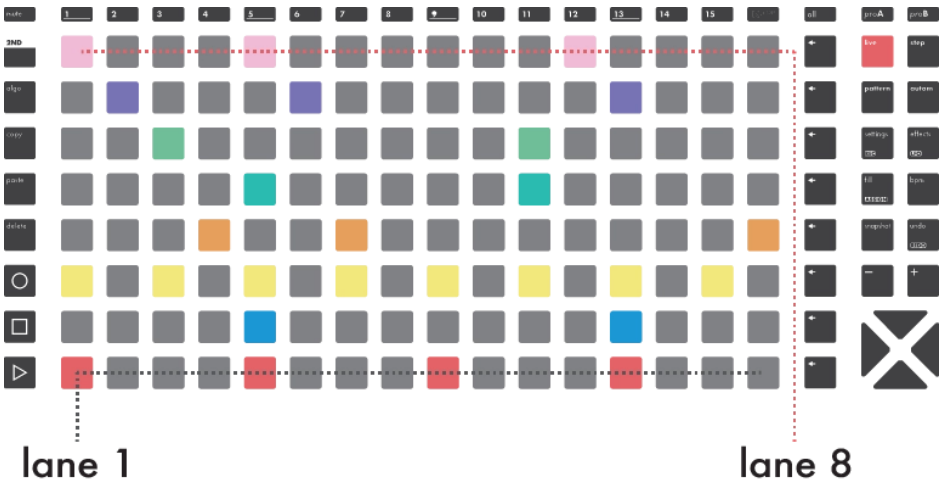


Once in step mode, Hold **step** and Rotate the menu encoder to set the track type to drum, and enter the drum step mode.

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

There are 8 lanes in total :





This step mode shares basic operations, selection & editing, copy/ paste, mute and loop points with the poly and MPE step modes.

A drum note as the same parameters as any other note: Velocity, Length, µTime, Chance, Roll and Math.

The principal difference is that instead of pitch & octave parameters, a drum note has a midi note and a midi channel, defining which drum element the lane will trig.

9.2. Select/Rename a lane

In drum tracks, events are organised in drum lanes. There are 8 drum lanes, named by default as follows:

1. Kick
2. Snare
3. Closed HH
4. Open HH
5. Low Tom
6. Hi Tom
7. Hand Clap
8. Cowbell

To select a drum lane, you can either:

- **Rotate** the main encoder
- **Press** the **row** button corresponding to the lane

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 change the midi note & channel output of a lane, **Hold** a **row** to select the lane, then rotate encoders ① and ② :

note 0 ... 127
Sets 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 trigged, and will output note 48.

channel 1 ... 16 Gate 1 ... Gate 4 Cv 1 ... Cv 4 Cv/Gate 1 ... Cv/Gate 4
Sets 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 even 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 independant from the track's channel.

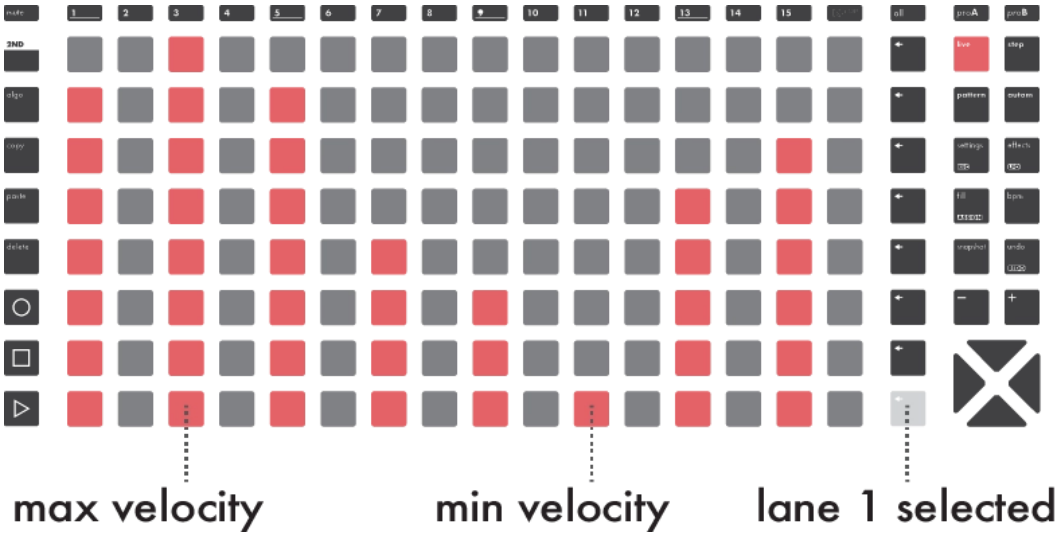
Tip **Hold** one or multiple **row** buttons and **Rotate** encoder ① or ② in order to change all selected lanes parameters at once.

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 velocity view mode, **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.



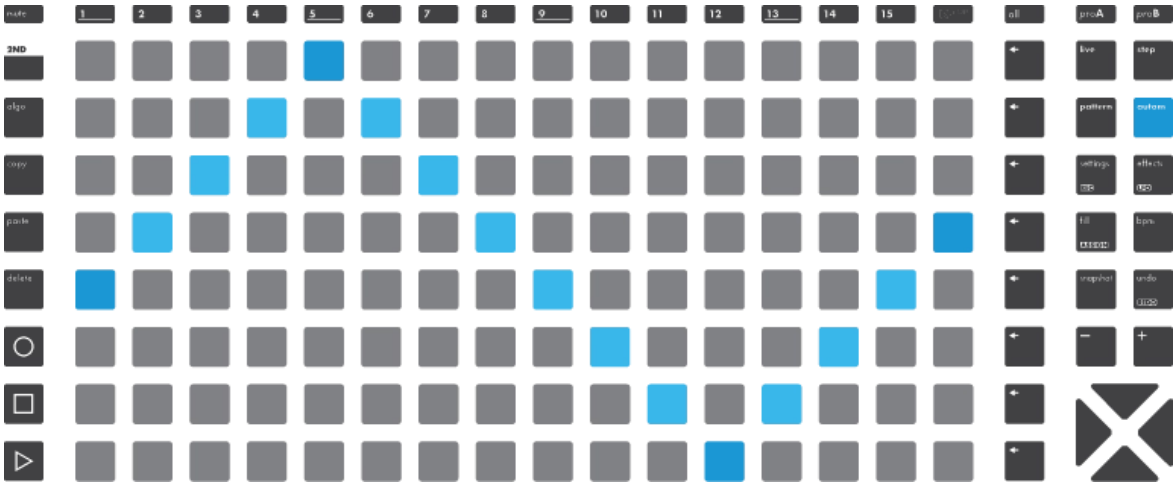
To exit velocity view, simply press **step**.

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 an unlimited number of automation lanes, and each pattern of a track can have different automation events.



10.2. Creating an automation lane

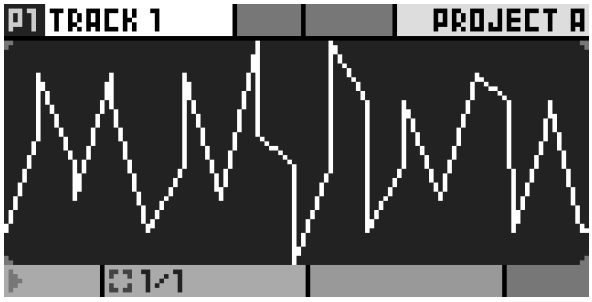
The automation screen is divided in lanes. Scroll to the bottom of the list, and click on "+ ADD". You will be prompted to choose a destination, which represents what you wish to automate.

Available destinations are:

- CC messages
- Pitchbend
- Aftertouch
- Program changes
- NRPN messages (Non-Registered Parameter Number)
- CV in (for recording purposes)
- CV out
- Effect parameters

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

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



In the example below, 6 automation lanes are created on the current track:

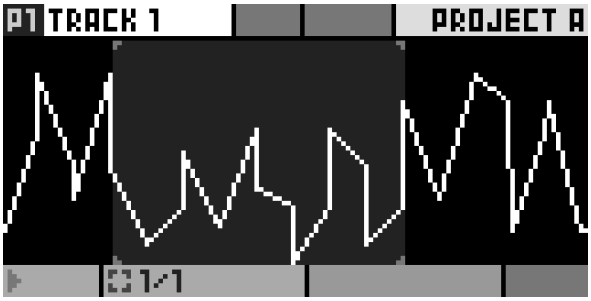
- cc8 has events
- cc14 is locked
- aftertouch is muted
- CV out 2 has no events
- Pitchbend has a default value
- NRPN has events

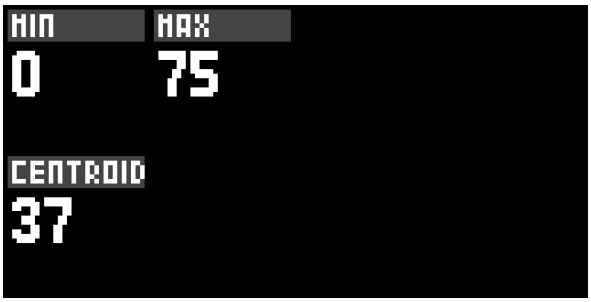
Tip You can create a curve before selecting a destination. Simply **Press** some pads when "+ ADD" is selected. This will create a *void* lane, with no destination. You can click the lane and assign its destination later. This helps sketching out ideas quickly, and store curve shapes that you like for 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).

When performing a multiple selection, you will have access to the 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 **mute** to mute this automation lane.

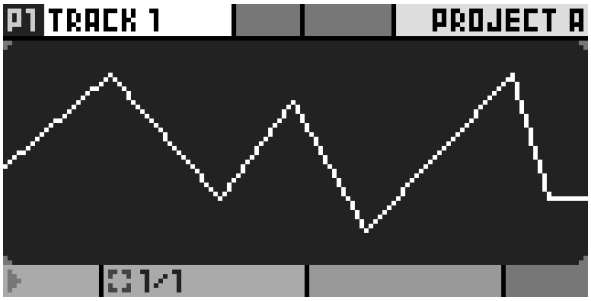
Note Mutes are per-pattern based.

Tip When a lane is muted in the current pattern, the lane shows an "M" status icon.

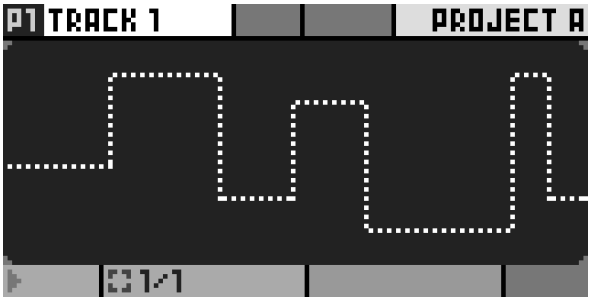
10.5. Interpolation

When this parameter is active, you can quickly draw lines and curves using very few automation events. This saves memory and time, and can be easier for drawing certain shapes. Upon disabling this parameter, the sequencing becomes stepped, meaning that values will be held until the next change.

Interpolation ON:

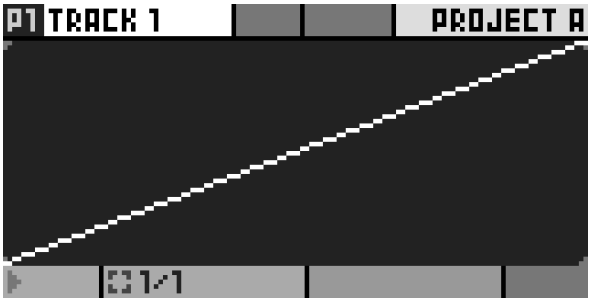


Interpolation OFF:



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, which is active by default, you can draw a ramp using only two points :

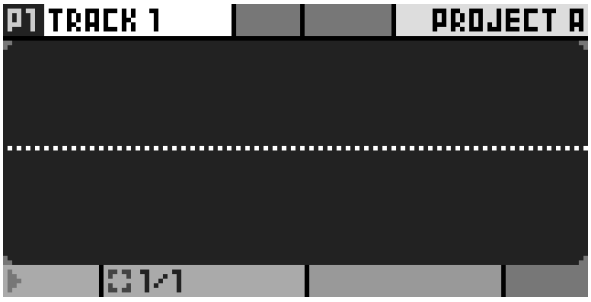


10.6. Default value

Encoder ⑥ allows you to define a default value that will be used when 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 upon a pattern change.

Example : setting a default value of 0% on the 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 :

CLEAR EVENTS

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

DELETE LANE

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" performance, 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
Equivalent to clicking on "+ ADD".

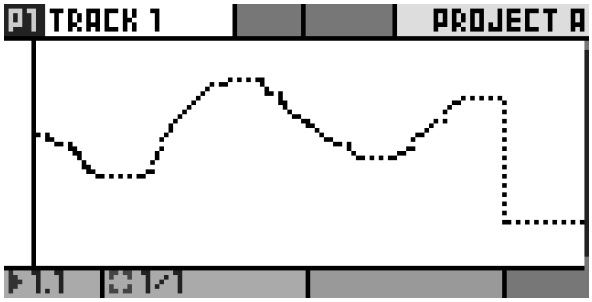
PASTE
In coordination with "copy", this pastes an entire automation.

PASTE TO...
Same as "paste", with the added option 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 before recording.

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

Tip To prevent overwriting a lane with incoming data, you may use the "Lock" function (see context-menu below).

11. Pattern mode

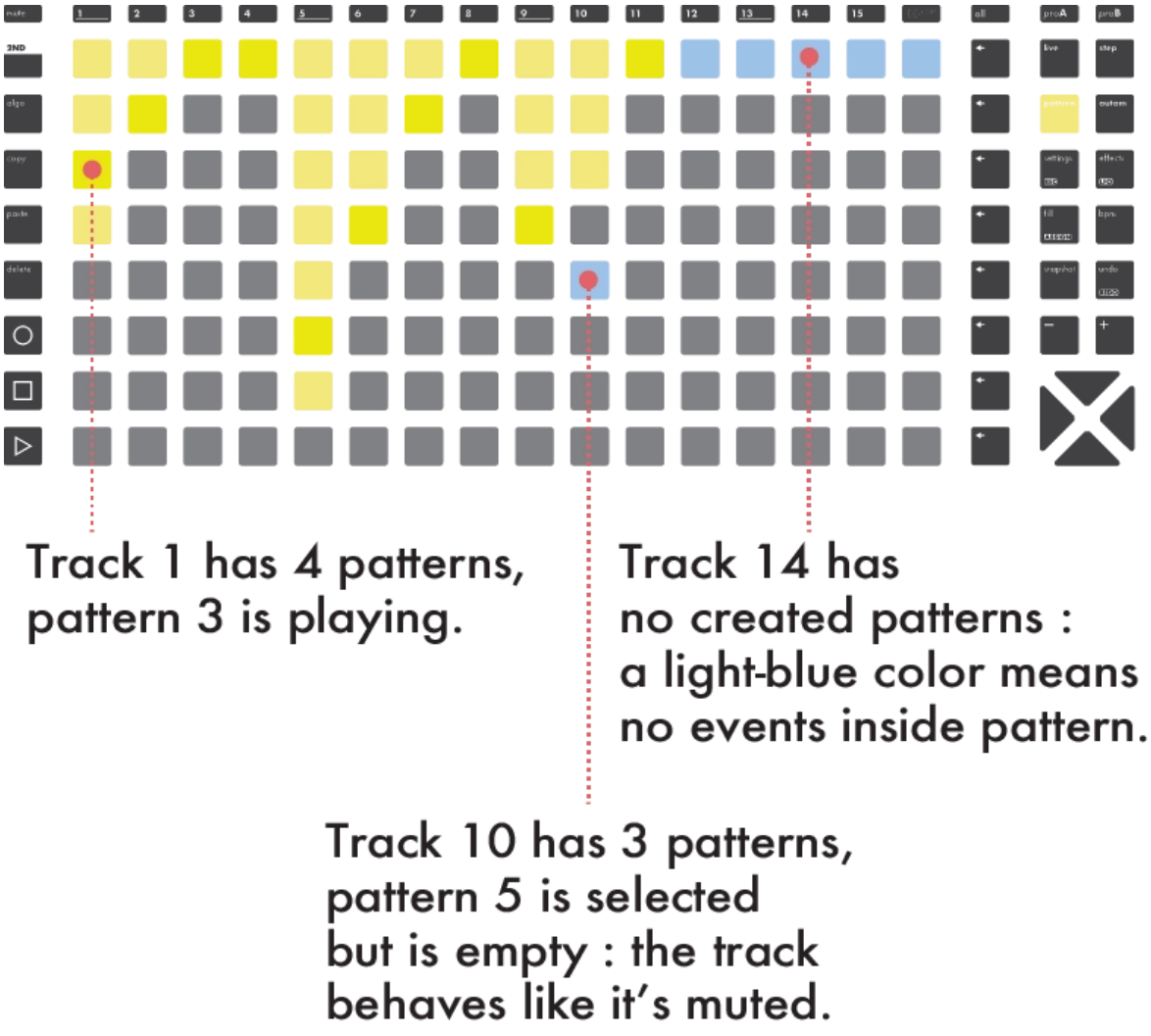
11.1. Overview

Once your tracks are created, the **pattern** mode enables you to play with your 128 patterns and to arrange them into a song.

Each Pattern is a loop that contains polyphonic or monophonics notes and automation. Patterns hold their own events, lengths, runmodes, effect parameter values, ...

Unlike most sequencers, each track is independant from the others: you can play track 01 pattern 3 and, at the same time, track 02 pattern 4.

On the matrix pads, each columns represent the eight patterns of the 16 tracks:



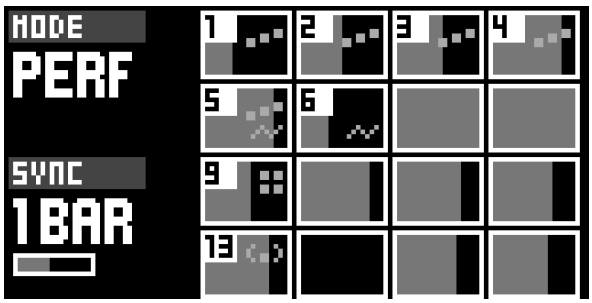
Tip From any mode : Hold **pattern** + any matrix pad to quickly select (and instantly launch) the pattern you want to edit.

Pattern mode has two playback types that you can choose from, using encoder ① :

- PERF — for live performing your patterns (default).
- SONG — see *Sections & songs* chapter below.

11.2. Patterns playback

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



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

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

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 launch, at the same time, 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 ② to set the sync division. Pattern leds blink when waiting to changes.

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. Mute / unmute

It is not possible to mute a single pattern, but you can mute a track by holding **mute** and pressing one or several **track** buttons.

A muted track will never output midi events, 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 mutliple selections.

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

Run – reverse ping-pong random bar random beat random 1/16
Sets the pattern playback mode. It can be played normally, in reverse, in ping-pong, or randomly (every bar, every beat, every 16th note).

Length 1 step ... 32 bars
Sets the duration of the pattern, in 16th notes (encoder ⑥ can be held while choosing the length for precise increments).

PC (LSB, MSB)
Program change midi messages to be sent when transitioning to this pattern. Optional extended PC logic with MSB/LSB.

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.

Multiple pattern selections are only possible within a given track, so the selection cannot span across multiple columns.

Tip **Press** **2ND** while making a selection to restrain it to the selected area.

Note These are the same pattern parameters accessible from **Hold** **track**.

11.7. Copy / paste / delete

Patterns can be copied, pasted and deleted, even from track to track.

- 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.

Please note that only one pattern can be copied at a time. This means the **copy** and **paste** buttons will have no action if you are selecting more than one pattern.

12. Sections & songs

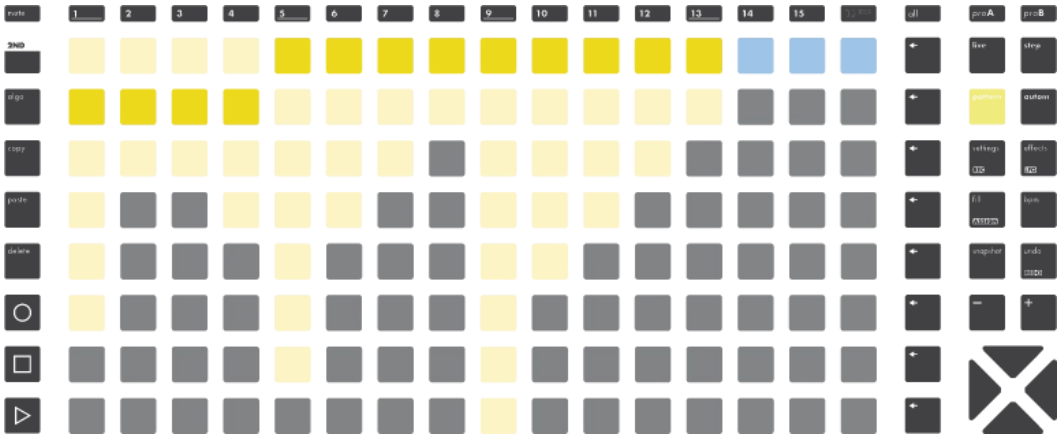
12.1. Sections

While the pads are very convenient to perform patterns by hand and following your instincts, you might want more control using written “sections”.

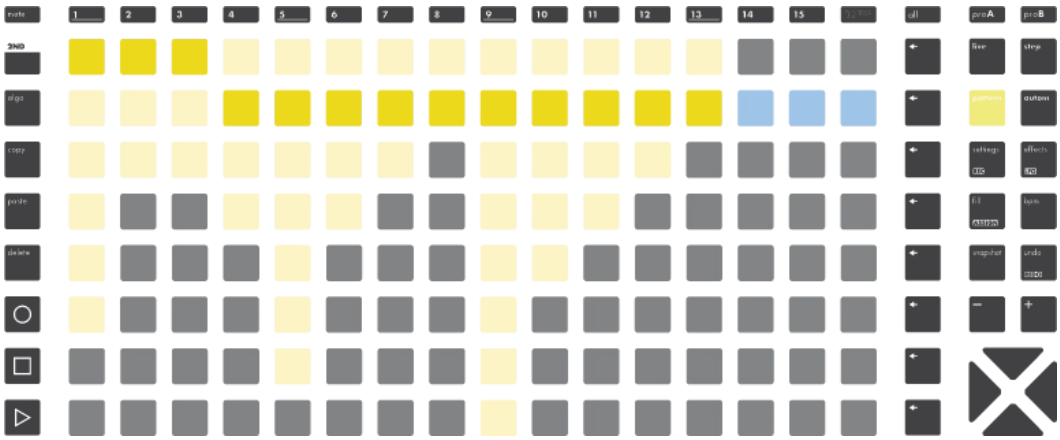
A section is a precise arrangement of patterns.

Let's see some examples:

We need a section called "Intro", with track 1 to track 4 playing pattern 2, and other tracks playing pattern 1.
On the grid, it would look like :



Now we need a section called "Verse", with track 1 to track 3 playing pattern 1, and the other tracks playing pattern 2.
On the grid, it would look like :



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

To edit a section, 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 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 overriden by the song's next scheduled section.

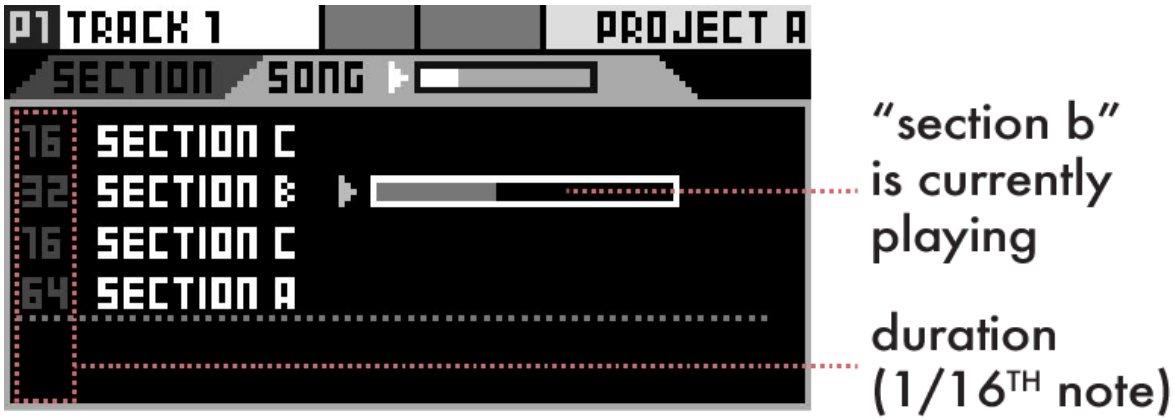
To toggle between section tab and song tab, simply Press **pattern**.

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 menu 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, instead of using "PERF" option, select one of the 2 song modes :

SONG PLAY

The song will stop playback when reaching its end.

SONG LOOP

The song will play in an infinite loop.

Press the ▷ button to start the song playback.

Tip When a song is playing, it's possible to set the mode to PERF : the song playback will be paused, allowing you to do live improvisation, manual pattern change, ... Then you can go back to SONG PLAY or SONG LOOP to continue the song playback.

12.7. Editing a song

Press the main encoder on a section to open a 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

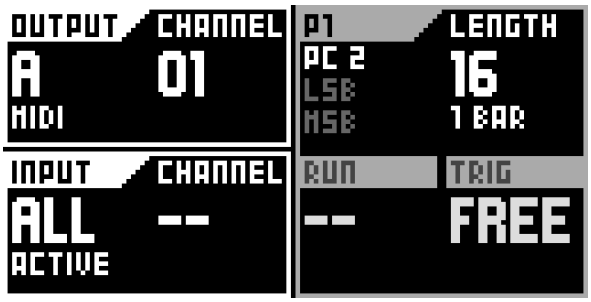
13.1. Overview

The 16 tracks of a project hold 8 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 **track** to enter the track settings menu : midi output, midi input, active pattern parameters (PC, length, run mode, trig) :



Hold **2ND** + **Press** **track** 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 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 MIDI port for 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
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. Prefered for MPE or Drum tracks.

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 configurating 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 a few time before, useful when controlling Elektron machines patterns.

Length 1 step ... 32 bars
Sets the length of the pattern in steps (1 step = 16th notes).

Tip **Hold** and **Rotate** encoder ⑥ 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 :
free Resets the position to the beginning of the pattern after a change.
restart Keeps the previous position of the player upon a pattern change. The playhead will not jump in this case.

13.3. Advanced track settings

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

Quantz – 1/64 1/32 1/24 1/16
Sets the quantization time division. Please note that this parameter will be overriden 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
If "pScale" is enabled in the project settings, this parameter will allow the current track to follow the project scale. This setting is disabled if pScale is not project enabled.

Track Name
Allows renaming your track.

Instrument Def
Shows wich 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.

13.4. Rearranging tracks

Hold a track button, then Press either ▶ or ◀, to swap existing tracks.

Please note that while the transpose track is originally at position 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.

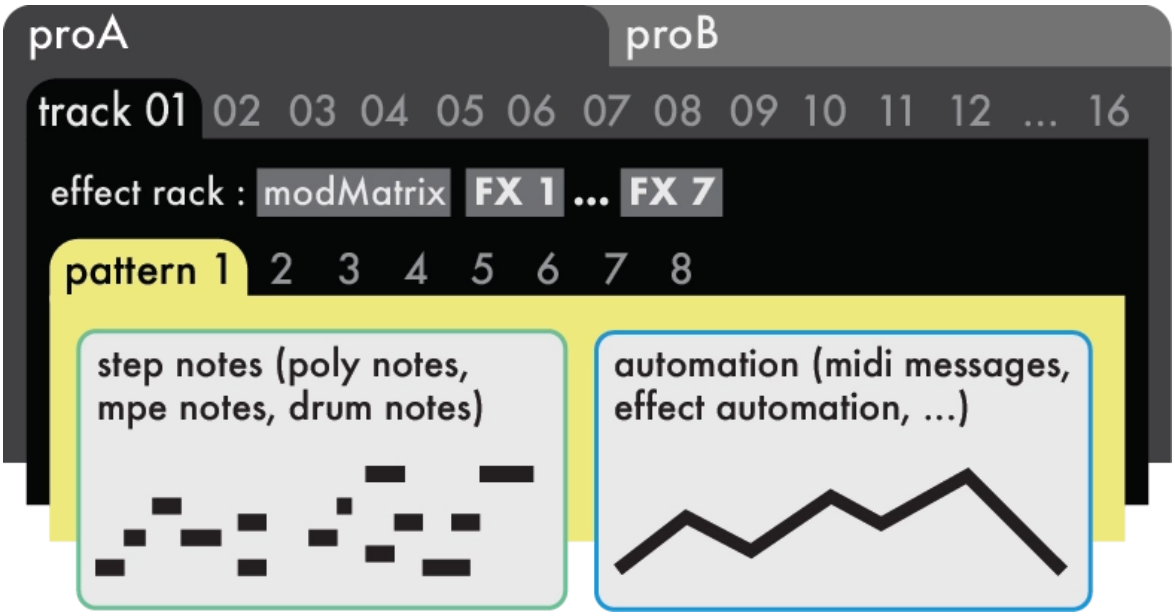
Download examples

Instrument definition examples are available online on our website:
https://squarp.net/hapax/manual/modetrack#rJmhPai

14. Projects

14.1. Overview

Hapax can handle two projects (proA, proB) simultaneously. Each project contain 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 seemlessly 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.

From this menu, you will be able to save your current project with the same name (SAVE), or a different name (SAVE AS...). You can also create a new project (NEW), or load a previously saved project (LOAD).

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 :

proA is playing, proB is empty

proA is playing, proB is loaded + muted

Then, while being on the freshly loaded project B, you are free to mute/unmute tracks and organize your patterns, in order to prepare your transition.

Tip You can also select project A and mute some tracks or change patterns in order to get ready for the project mix.

When you are ready to launch project B, **Hold** **mute** and **Press** **proB** : both projects are now playing!

proA is playing, proB is playing

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

proA is muted, proB is playing

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, ...

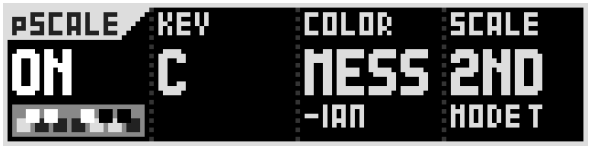
Note When loading a project, if this project BPM differs from the playing project BPM, you will be asked to update the tempo (the two projects must share the same BPM for proper transitions).

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.

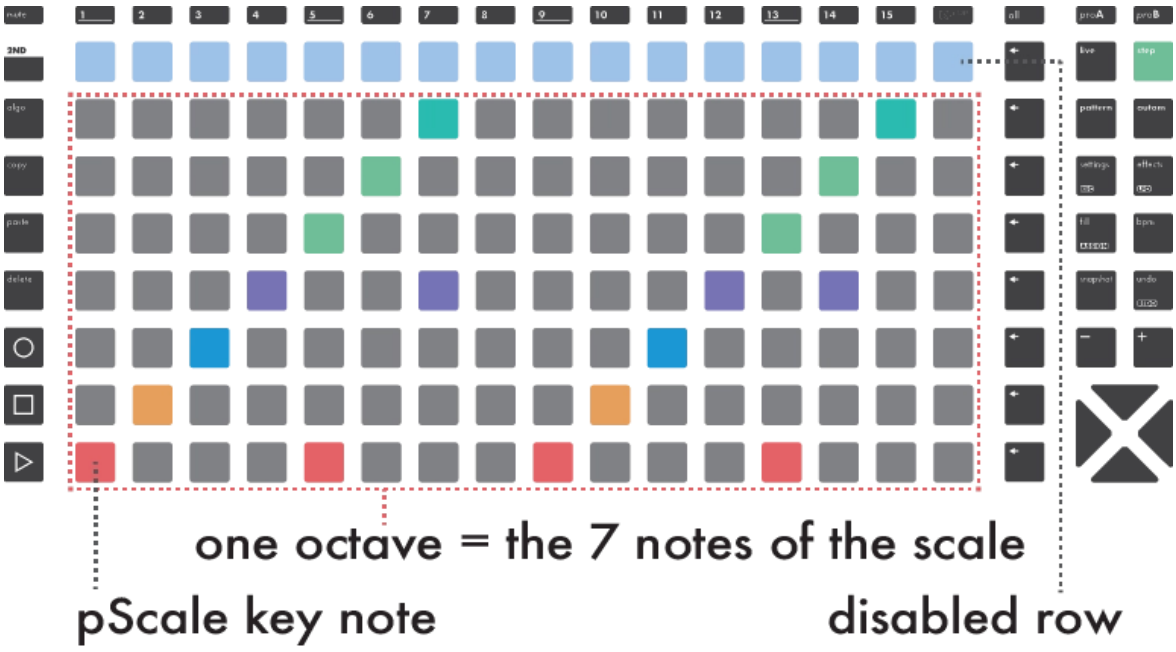
Hold **proA** or **proB** to display the selected project settings on the left screen :



If you turn the 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.



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

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 This option can be disabled under : SETTINGS > MISC > SPLIT BARS = OFF

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 eight 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 ⑦ 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, please go to **settings**, enter MISC and set the pTRSP SYNC (instant, 1-beat, 1-bar, ...).

Tip To set the transpose center note (the note defining a "+0" transpose), please go to **settings**, enter MISC and set the TRANSPOSE ROOT. 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):

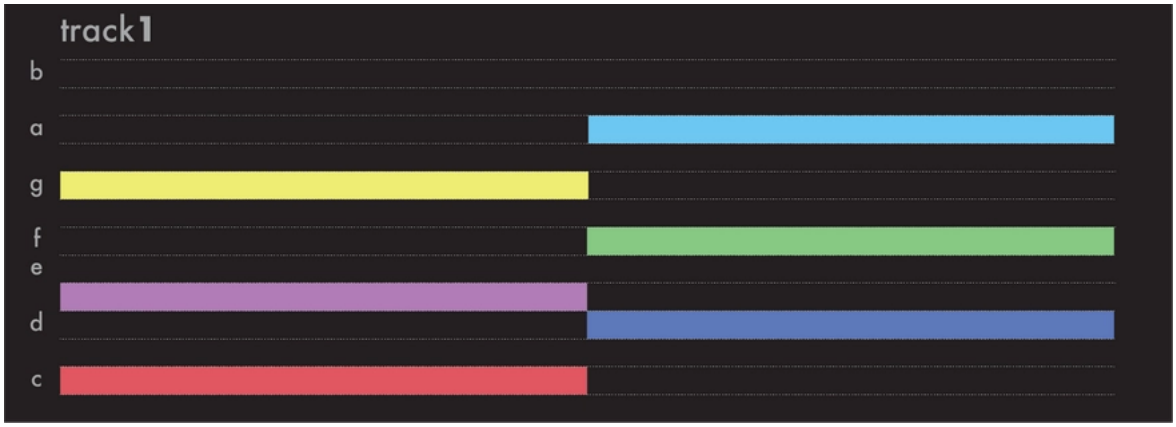
Note When using Match Chord, note's octaves have no effect: only the chromatic scale (the set of twelve pitches, from C to B) will be used to quantize the other tracks.

Tip If the pTRSP SYNC setting is enabled, you can use the livemode parameter PLAY (Hold or Relatch) on track 16 to sustain what is played.

Note By default, the change is instantly applied. To enable synchronized changes, please go to **settings**, enter MISC and set the pTRSP SYNC (instant, 1-beat, 1-bar, ...). You will need to sustain the chord 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)

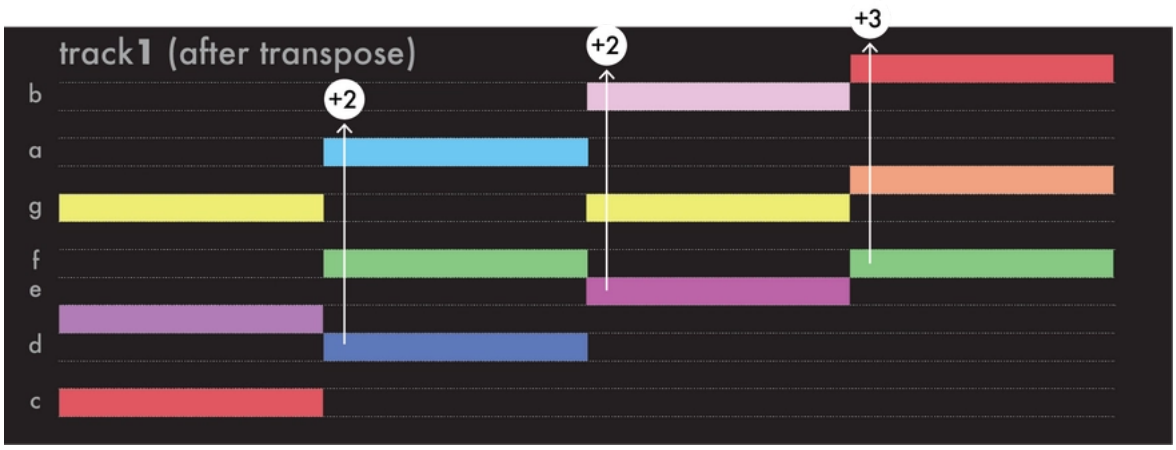


On track 16 (trsp = transpose), let's play some notes either with the live mode keypads, with an external keyboard, or by adding notes in step mode:

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".

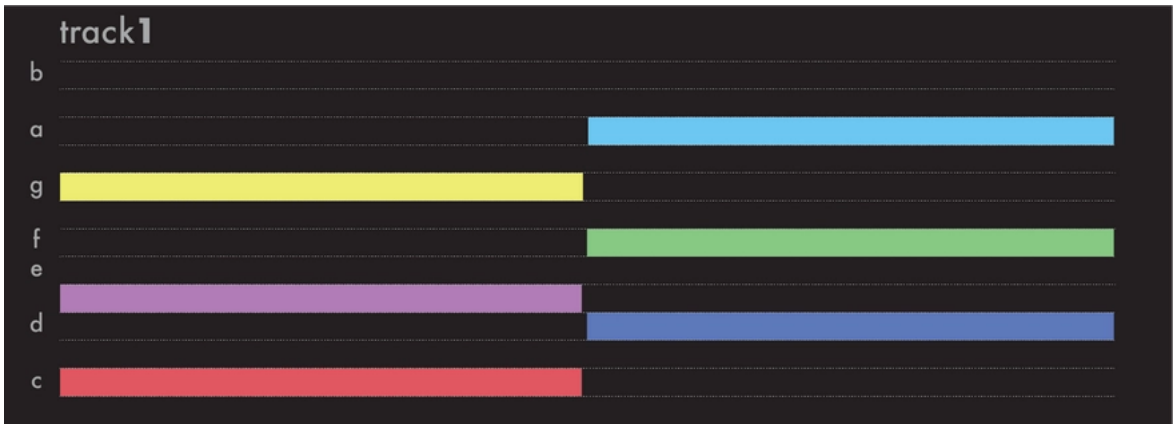
The second note (D) will transpose the following tracks (track 1 to 15) by "+2". The third note will transpose by "+3".

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

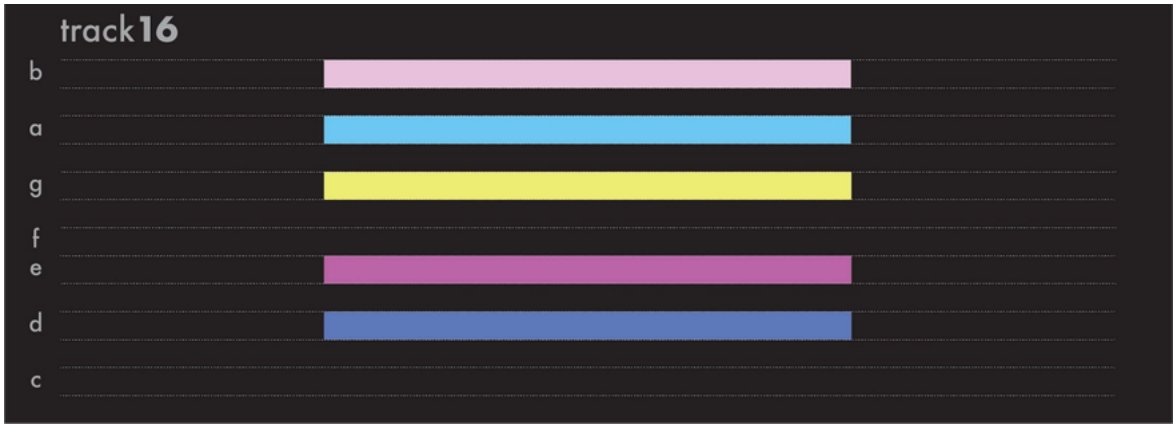


14.8. TRSP Match chord in practice

On track 1, let's add a simple chord progression :
(Cmin - Dmin)

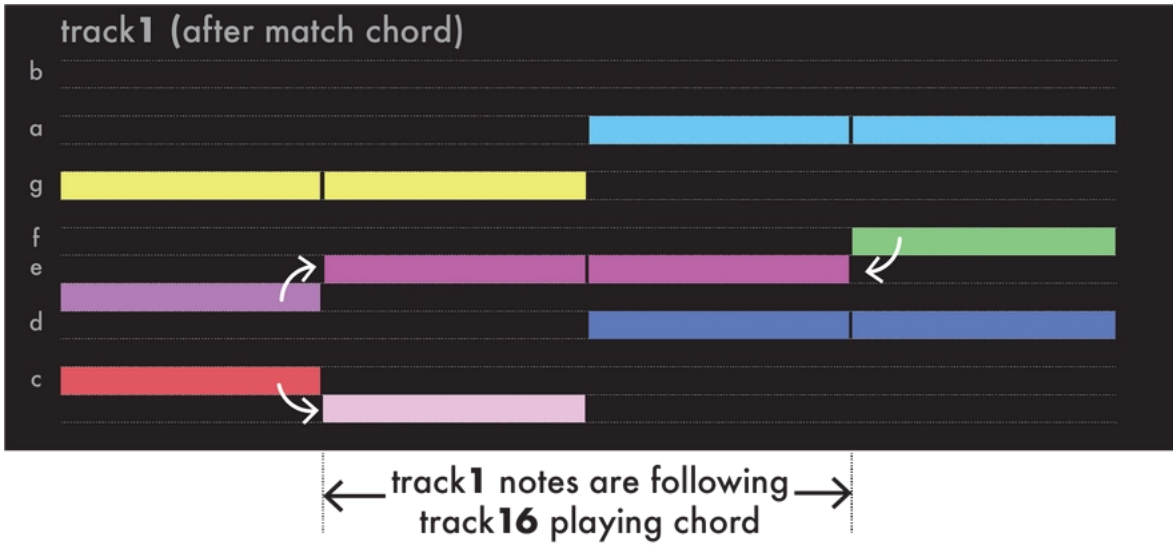


On track 16 (trsp = match chord), let's play a chord either with the live mode keypads, with an external keyboard, or by adding notes in step mode:



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:

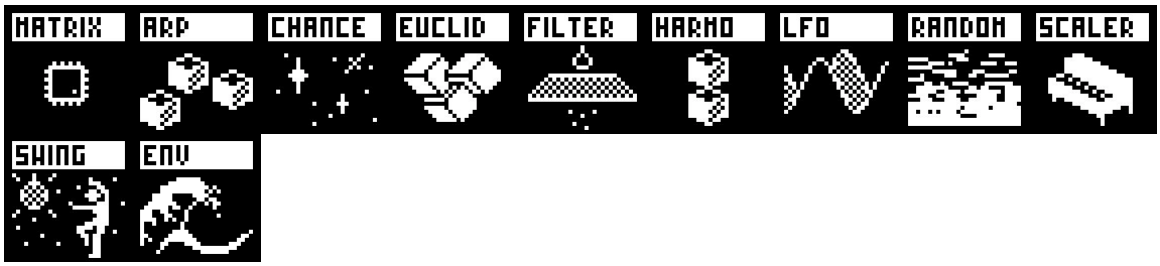
- If track 16 is playing only 1 note (e.g. C), as the other track's notes must match the track 16 chord, track 1 to 15 will only output C notes.
- If track 16 is playing the 12 chromatic notes, the other tracks notes will remain unchanged.

15. Effects

15.1. Overview

You can add up to 8 real-time effects per track. 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. Adding an effect, tweaking parameters

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

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

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

15.3. Advanced operations

Select an effect and **Press** menu encoder : a context menu will appear, allowing you to :

- toggle the effect (mute/unmute it)
- delete it
- replace it (by another effect)
- copy/paste 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** "TOGGLE ON/OFF" to lock the effect mute/unmute on the selected pattern: "ON*" (or "OFF*" if the effect is muted) will appears on the top of the context menu when it's locked.

15.4. Locking effect parameters to patterns

While effect parameters are per-track by default, a pattern may lock an effect parameter to a specific value. Changing the parameter's value on another pattern will not change the value on the pattern onto which it is locked.

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.

15.5. 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.

With the associated encoders you can configure each of the 4 modMatrix parameters :

- Depth : amplify, attenuate or invert the input signal
- Offset : Set the modulation central value
- Polarity : modulate value around or after the offset
- Consume : drop the input signal

15.6. Arpeggiator

STYLE UP DOWN UP/DOWN ASSIGN RANDOM

Direction of the arpeggiated pattern. UP plays the pattern from the lowest note to hightest. RANDOM will play notes in a random order. ASSIGN will play notes in the order they were played.

RATE 1/1 ... 1/64

Speed of the pattern. A rate of 1/4 will play a note of the arppegio 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 ARP 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

15.7. 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

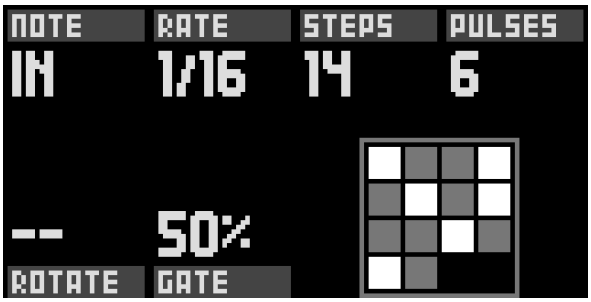
played. If ”99%”, the note will almost always be played. If ”VELOCITY,” the note will have the same probability of being played as its velocity. Very handy for programming different per note probability.

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 sync = ”1/4”, all notes that fall precisely on a quarter note will have a different probability of being played. If 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 sync = ”1/4” and sync chance = ”100%”, all beat notes will be played.

15.8. Euclid



Easily generate euclidian rhythms with this effect.

NOTE IN C0 (0) ... G10 (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 euclidian rhythm. Alternatively, you can choose to ignore the input, and generate a euclidian 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 polymetric 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 euclidian sequencer.

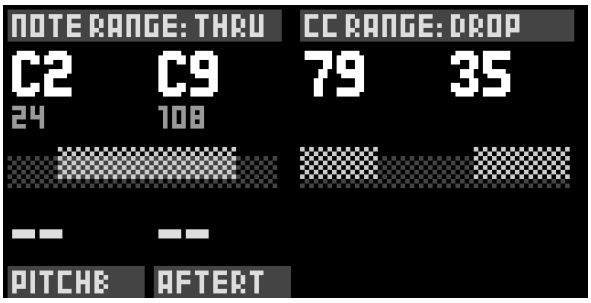
STEPS 1 ... 32
Sets the amount of steps in the full cycle.

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.

15.9. Filter



NOTE LO / NOTE HI C0 (0) ... G 10 (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.

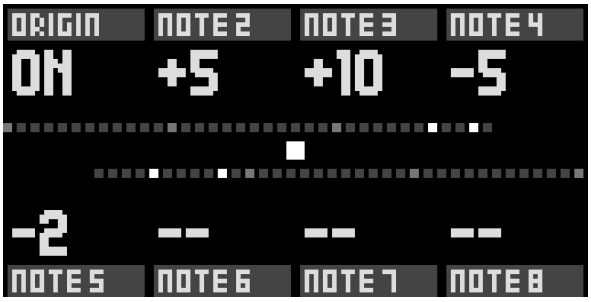
CC LO / CC HI 0 ... 127
Similarly to notes, CC messages falling in certain ranges can be accepted, or dropped. When "CC LO" < "CC HI", this sets the range of CCs that can be let through the Filter. When "CC LO" > "CC HI" however, this sets a range of CCs to ignore.

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.

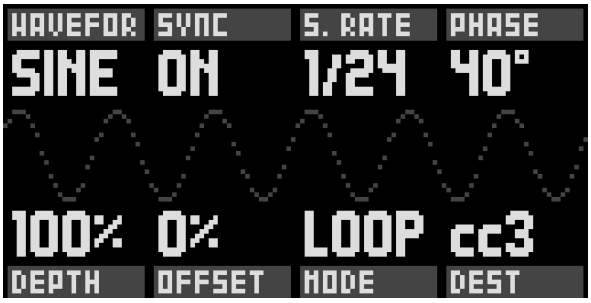
15.10. Harmonizer



ORIGIN ON OFF
When ON, will let incoming MIDI notes through, and output harmonized version of these notes. When OFF, will drop the incoming notes, and only output harmonized notes.

NOTE 2 ... 8 -36 ... +36
Choose up to 7 intervals with which to harmonize incoming notes, to generate complex chords.

15.11. LFO



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

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

Retriggers on every note

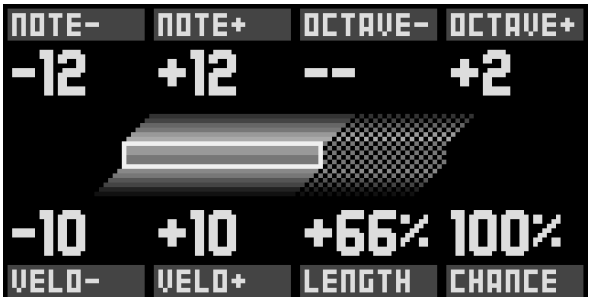
ONCE, 2x, ... 16x

Plays once or multiple times through the waveform, then stops, like an envelope

DEST CC PITCHBEND CV OUT ... FX PARAMETER

Destination of the LFO.

15.12. Randomizer



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 ... 63

Increase the random velocity range downwards and upwards respectively.

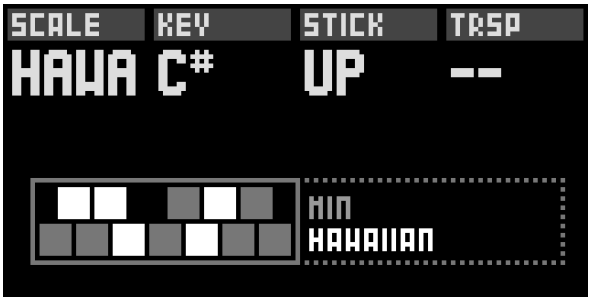
LENGTH 0% ... 100%

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.

15.13. Scaler



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.

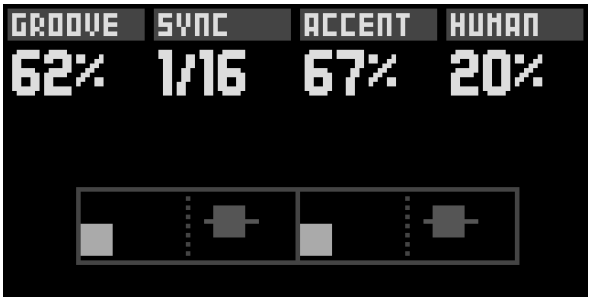
KEY C ... B
Choose the root note of the scale.

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.

15.14. Swing



GROOVE 50% ... 100%
Percentage of swing (delay the off-grid notes position). 50% (default) has no effect on 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.

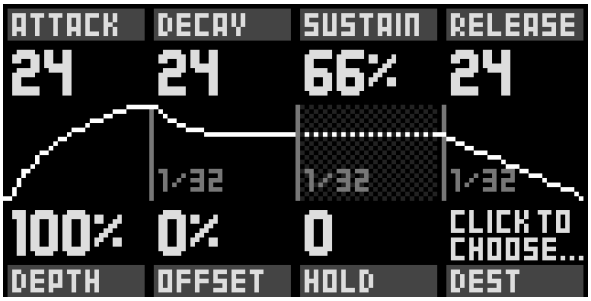
ACCENT 0% ... 100%
Amount of swing velocity accent. This parameters affect all notes.

HUMAN 0% ... 100%
Slightly randomize the position of swung notes (humanizer).

15.15. Env

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.

CURVE A -100% ... 100%
Curvature of the ATTACK portion of the envelope. Positive values produce an exponential curve, while negative values produce a logarithmic curve.

DECAY 0 ... 3072
Duration of the DECAY portion of the envelope, in clock ticks.

CURVE D -100% ... 100%
Curvature of the DECAY portion of the envelope. Positive values produce an exponential curve, while negative values produce a logarithmic curve.

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.

CURVE R -100% ... 100%
Curvature of the RELEASE portion of the envelope. Positive values produce an exponential curve, while negative values produce a logarithmic curve.

DEPTH -100% ... 100%
Scales the ENV.

OFFSET 0% ... 100%
Offsets the ENV central value.

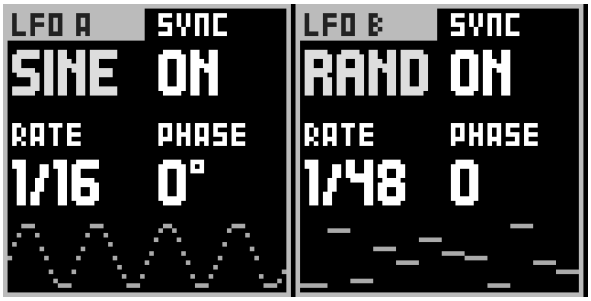
HOLD 0 ... 3072
Duration of the HOLD portion of the envelope, in clock ticks. This section is in between the attack and the decay.

DEST CC PITCHBEND CV OUT ... FX PARAMETER
Destination of the envelope.

Note 3072 clock ticks corresponds to 4 bars of 4/4.

15.16. 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.

15.17. 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** mode, press algo to enter this submode.

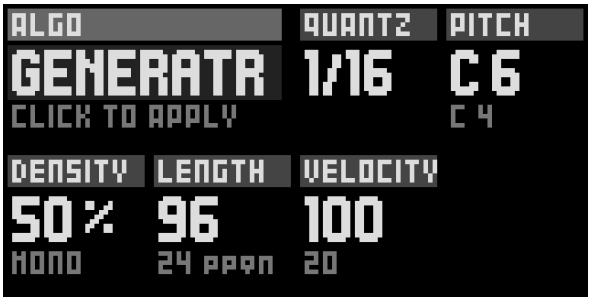
Select the algorithm by scrolling encoder ① and **Press** it to apply the algo on the pattern you are working on. The other encoders let you configure the algorithm parameters.

Some parameters have a secondary value that you can set by holding the associated encoder and scrolling it.

Tip When you apply an algo while performing a selection, the algo will process only the selection.

16.2. Generatr

Availability : **step** poly + **step** drum



Clear notes and generate a randomized pattern. Generated notes are quantized to a grid that you define, and you can set the min & max note pitch/velocity/length range. You can also set the amount of events (density %) and decide to generate mono notes or chords (mono … poly 4).

Quantz 1/1 ... 1/64
Grid on which the generator will apply notes.

Pitch C0 ... G10

Rotate encoder to change the highest note that can be generated.
Hold + Rotate encoder to change the lowest note that can be generated.

Density 0% ... 100%

Rotate encoder to set notes density span in the pattern.
Hold + Rotate encoder to change the secondary parameter:
Mono Only one note per grid.
Poly 2 / 3 / 4 Enables polyphony (chords): 2, 3 or 4 notes at the same time.

Length 1 ppqn ... X ppqn

Rotate encoder to set maximum note length.
Hold + Rotate encoder to set minimum note length.
96 ppqn = 1/8 note.
24 ppqn = 1/32 note.

Velocity min/max 0 ... 127

Rotate encoder to set maximum note velocity.
Hold + Rotate encoder to set minimum note velocity.

16.3. Curves

Availability : **step** poly + **step** drum

Modify parameters of existing notes following a curve. You can set the LFO wave (sine, triangle...), its amplitude min & max, its rate. The default parameter to be processed is the velocity, but you can also set other destinations (length, chance...).

For example if you apply a ramp on velocity, this will ends up in a "velocity fade in". Your notes will be louder at the end of your pattern and almost muted at the beginning.

Wave Sine Tri Ramp Squa Rand
Choose your waveform.

Amplitude 0% ... 100%
Waveform amplitude.

Rate x1 ... x8
Number of repeats of your waveform.

Dest
Set the destination note parameter to modulate:
Vel Velocity
Leng Length
Roll Roll
Math Math (conditional trigs)
Chan Chance
uTime uTime (groove)

16.4. Symmetry

Availability : **step** poly + **step** drum

Reorganize your existing pattern with symmetry. Events can be flipped horizontally (time) or vertically (pitch).

Symmetry Time Pitch
Choose whether you want an horizontal (Time) or vertical (pitch) symmetry.

Duplicate
Off Existing events will erased.
On Events will be generated on top of your previous pattern.

16.5. Every N

Availability : **step** drum

Choose a Grid and create evenly spread notes with accentuation based on the N parameter. This algorithm is very powerfull for Drum sequencing.

Grid 1/1 ... 1/64
Grid used for generation.

N 1 ... 16
Accentuation each N.
For example : N = 2, every second note will be accentuated.

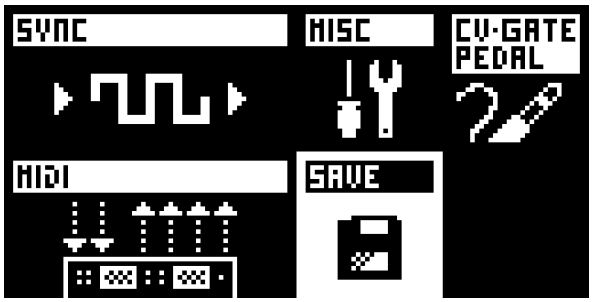
Accent V 0 ... 127
Accent Velocity.

Ghost V 0 ... 127
Ghost 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

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 connected on the CV input 1.
CV IN 2 Hapax will follows an analog gate input, if connected on the CV input 2.

Tip When using CV IN 1 or CV IN 2, Hapax is synchronized in a "step advance" (trigger) style. The setting CV CLOCK DIV let 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 BPM to 140.

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.

CV run

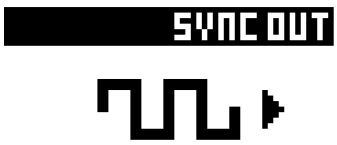
CV IN 1 Use an analog gate on CV input 1 to start the playback. A high state will run the sequencer, a low state will stop & reset the playback.

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 = 24ppqn ... 1/4 = 1ppqn

When CLOCK SOURCE = CV IN, sets the speed of the expected incoming clock.

17.3. Sync output



MIDI A/B/C/D, USB device/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.

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.

Gate play – Gate 1 ... Gate 4
Selected gate output will be set to high level when Hapax is playing, and low level when Hapax is stopped.

Gate reset – Gate 1 ... Gate 4
Selected gate output will be set to high level when Hapax is stopped, and low level when Hapax is playing.

Gate clock – Gate 1 ... Gate 4
Selected gate will output a synchronisation clock, with a 50% duty cycle.

Gate clock div 1/96 = 24ppqn ... 1/1 = 1 bar
When GATE CLOCK is enable: sets the speed/resolution of the clock.

17.4. Misc

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.

Transpose root C0 ... C6 ... G10
Set the "center note" defining TRSP = +0 (no transposition). Works only for project pTRSP=TRSP.

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.

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.

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.

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 ON (on the playhead) are not retrigged.

ON Retrig notes that should be playing when unmuting a track.

Note This is an advanced setting, default value (ON) is probably what you need.

Palette >

Enter the color palette mode, to customize RGB leds colors thanks to encoders ①…⑧ (read section Color palette).

Info >

Display HapaxOs version and real-time CPU usage.

Select +/- WARP ROTATE

Determines the behaviour of the + and - buttons during a STEP mode multiple-events selection.

Debug Enabled Off On

Enable debug shortcuts for debugging purposes.

17.5. CV/Gate + pedal

CV IN range -5.0v > +5.0v 0.0v > +5.0v
Set the input voltage range Hapax can process, for the 2x CV inputs.

CV OUT range -5.0v > +5.0v 0.0v > +5.0v
Set the voltage range Hapax can output, for the 4x CV outputs.

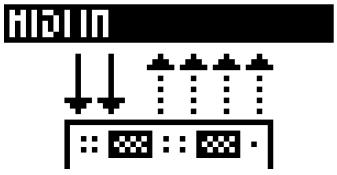
CV OUT type 1V/octave 1.2V/octave
Each CV can be set to output the eurorack standard 1V/octave, or 1.2V/octave (e.g. when using Buchla synths).

GATE polarity HIGH=5V HIGH=0V
Set the gate ON level (5V or 0V).

Pedal hot – REC PLAY/STOP PLAY/RESTART
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 cold – REC PLAY/STOP PLAY/RESTART
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 – IGNORE
Ignore Ignore incoming midi notes

CC Messages – IGNORE

Ignore Ignore incoming midi CC messages.

Pitchbend – IGNORE

Ignore Ignore incoming midi pitchbend events.

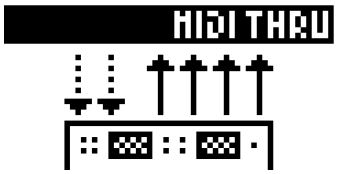
Pressure – IGNORE

Ignore Ignore incoming midi aftertouch events.

Program change – IGNORE

Ignore Ignore incoming midi PC (program change) events.

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. Color palette

Under Palette you will be able to finetune custom RGB led colors. This is very usefull if you already have strong synestetic habits.

Toggle **settings** button and enter "Settings > MISC > Palette".

You will see the colour chart on the matrix pads (a RGB color is made of 3 elements: red, green and blue).

Palette Note Misc Drum Patt Auto

This parameters allows you to scroll among all available palettes thanks to encoder ①, and then scroll between the type of color you will edit with encoder ⑤:

Note Each of the 12 notes, from C to B

Drum Each of the 8 lanes, from 1 to 8

Misc Miscellaneous colors:

- Selec : Selections
- Mute : Muted notes
- Void : Automation events of "void lane" (no destination set) events
- Disab : Disabled areas (loop points, out of pScale)

Patt Pattern colors:

- VOID : empty patterns
- VO-S : empty pattern (selected)
- Play : playing patterns
- VO-S : playing pattern (selected)

Auto Automation colors:

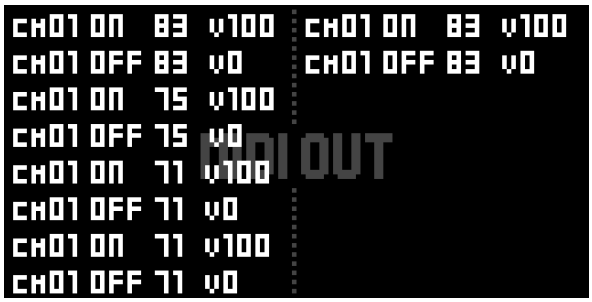
- REG (regular) : automation regular events.
- DEFA (default) : automation default values.

Red / Green / Blue 0% ... 100%

Rotate encoders to add or remove this color compound in the mix.

17.9. Midi monitor

Hold 2ND + Toggle live to display the midi monitor, showing midi in events (left screen) and midi out events (right screen).



17.10. 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. Ajust 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).