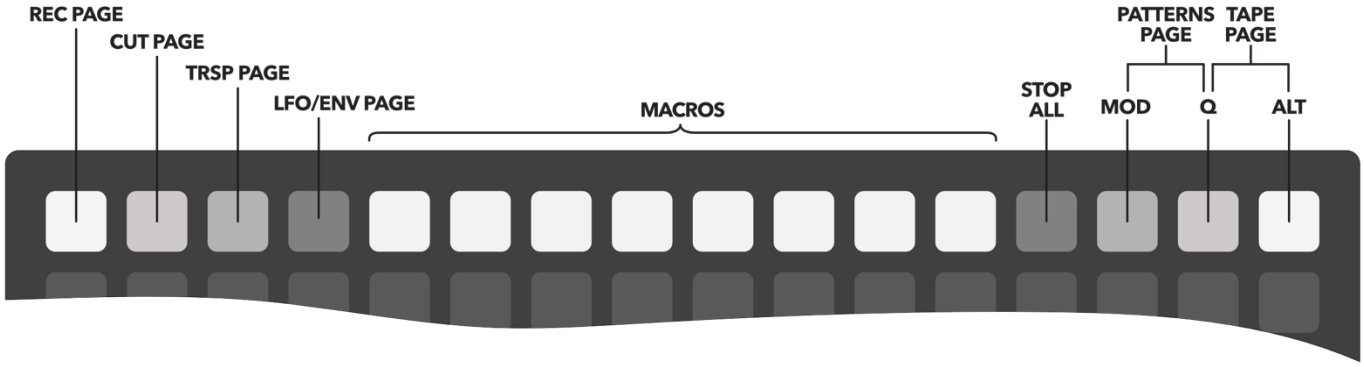
mlre is an extended version of tehn's mlr. New features and functionality were added with performative aspects in mind, trying to optimize grid and UI interaction but keeping it as close to the original as possible. This manual covers all additional features and changes. If something is unclear, please post your questions on llllllll.co in the mlre thread. Enjoy!

TABLE OF CONTENTS:

GRID NAVIGATION:

The **GRID NAVIGATION** is referred to as the top row of the grid and is accessible from all pages. If a grid 256/zero is connected at script launch, there will be two grid navigation rows at the centre of the grid. Their functionality is identical except for the macro keys: the top row will display 8 pattern keys and the bottom row 8 recall keys.



GRID NAV KEYS:

- Press the keys **REC PAGE – LFO PAGE** to access the grid interface of the corresponding page.
- To access the **ENV PAGE** press the **LFO PAGE** key twice.
- To access the **TAPE PAGE** hold **ALT** and press **Q**.
- To access the **PATTERNS PAGE** hold **MOD** and press **Q**.
- **MACROS** are keys that can be used to record key gestures, recall key states, or track parameter snapshots. Read more about **MACROS** in the **PATTERNS PAGE** section.
- Press the **STOP ALL** to stop all playing tracks and patterns.
- Press **Q** to toggle **key quantization** on/off. When key quantization is enabled grid key presses are quantized according to the **quantization rate**, which can be set on the **PATTERNS PAGE**. Quantization events are synced to the system clock.
- **ALT** and **MOD** are modifier keys and used for different **KEY COMBOS**.

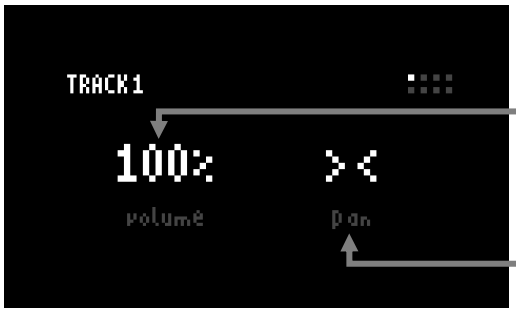
KEY COMBOS:

- Hold **ALT** and press **REC PAGE** to **clear** the **active splice** of the **focused** track.
- Hold **ALT** and press **CUT PAGE** to **clear** the **whole tape** of the **focused** track.
- Hold **ALT** and press **TRSP PAGE** to **clear** both tape sides for **all** tracks (clear the whole buffer).
- Hold **ALT** and press **MOD** to reset the playback position of all playing tracks to the first step (loops are cleared).
- Hold **ALT** and press **STOP ALL** to trigger **ALT RUN** (see **REC PAGE**).
- Hold **MOD** and press **ALT** then release **MOD** to lock into **HOLD MODE** (see **CUT PAGE**). Press **MOD** to unlock.

MAIN VIEW:

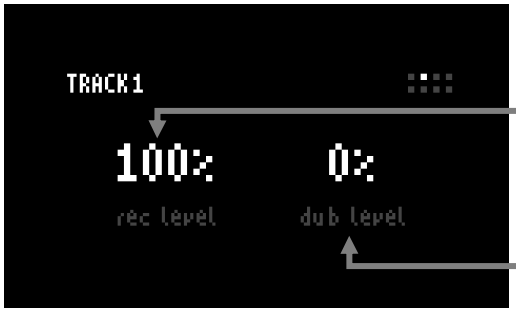
Main view is referred to as norns' interface while on the **REC-**, **CUT-** and **TRSP PAGE**. All other pages display their own set of page-specific parameters / options.

In main view the screen displays 16 different track parameters distributed over 8 pages. Use **K2** and **K3** to cycle through the 8 pages and **ENC2** and **ENC3** to change the values of the displayed parameters. The focused track can be selected with **ENC1** or via **grid** (see corresponding **PAGE** sections). If an arc controller is connected hold **K1** and press **K3** to switch between the different arc pages (see **ARC CONTROL**).



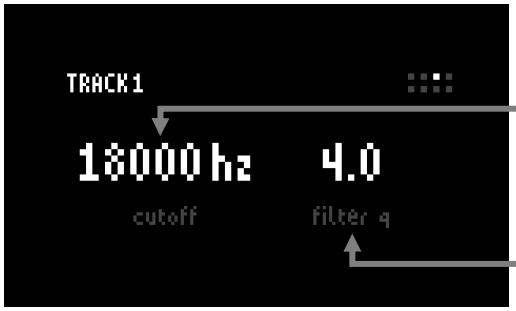
track volume [0 – 100%]:
If a track is muted (**ALT** + **PLAY**) the PLAY key of the corresponding track flashes.

pan [R 100 >< 100 L]



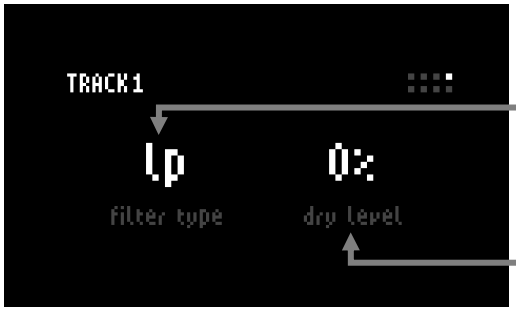
rec level [0 – 100%]:
sets the amount of input signal that is recorded.

dub level [0 – 100%]:
sets the overdub level i.e. the amount of the recorded material is preserved.



cutoff [20 – 18000Hz]:
sets the cutoff frequency of the filter.

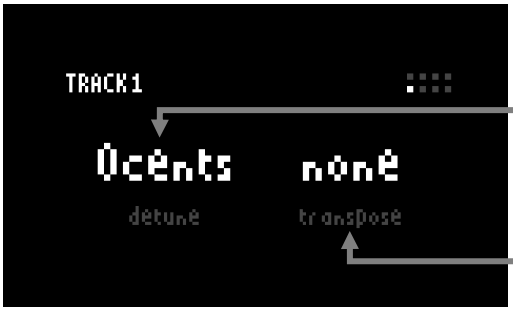
filter q [0.01 – 4.0]:
sets the q value of the filter (lower values lead to higher resonance).



filter type [lp, hp, bp, br, off]:
sets the filter type (when set to off **dry level** has no effect).

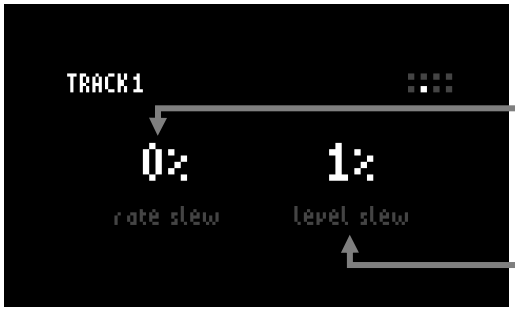
dry level [0 – 100%]:
sets the amount of dry signal (bypasses the filter).

MAIN VIEW continued:



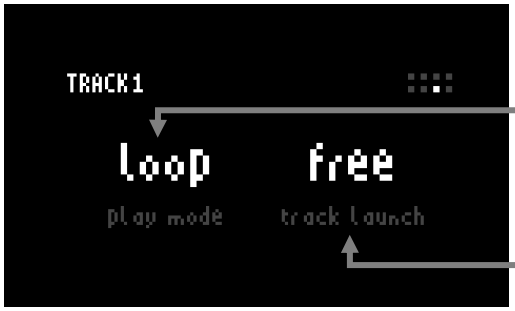
detune [-600 – 600 cents]:
sets the fine tune in cent steps (changes playback rate)

transpose [scale degrees]:
sets the track transposition according to the selected scale (see **GLOBAL PARAMETERS**).



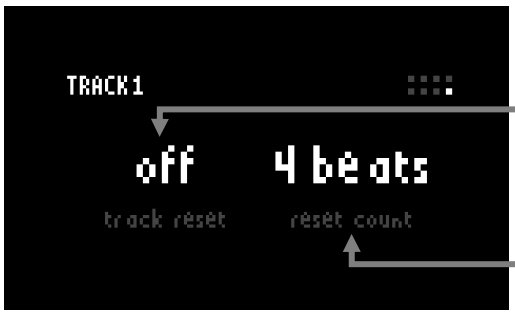
rate slew [0 – 100%]:
sets the slew time of rate changes (100% corresponds to 1s slew time).

level slew [1 – 100%]:
sets the slew time of volume changes (100% corresponds to 10s slew time).



play mode [loop, oneshot, gate]:
sets the playback mode of the corresponding track (see **TRACK PARAMETERS**).

track launch [free, beat, bar]:
sets the start behaviour of the corresponding track (see **TRACK PARAMETERS**).

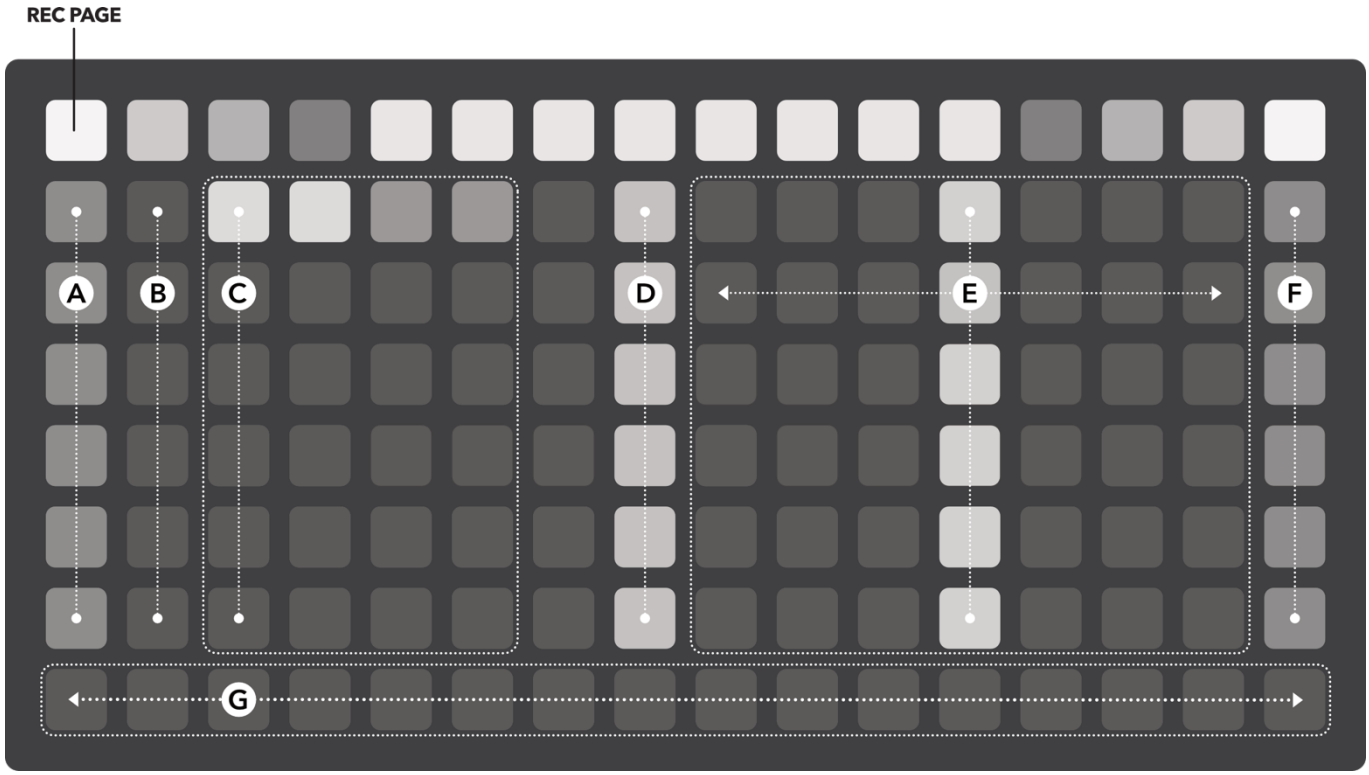


track reset [off, on]:
enables track reset behaviour (see **TRACK PARAMETERS**).

reset count [2 – 64 beats]:
if track reset is enabled the start position is reset after the specified number of beats (synced to the system clock).

REC PAGE:

The **REC PAGE** consists of six track rows divided in six sections **A-F**. The bottom row (section **G**) displays the **playback row** of the **focused** track as found on the **CUT PAGE**. If a grid 256/zero is connected the bottom row is not displayed *when* the **REC PAGE** is displayed on the *upper* half of the grid.



REC PAGE OVERVIEW:

A: Press to toggle **REC** on/off for tracks 1-6. Hold **ALT** and press the key to activate **fade out mode**.

B: Press to **ARM** the track for **one-shot recording**. Hold **ALT** and press the key to **ARM** the track **and** enable **auto-length mode**. A flashing key indicates an armed track.

C: Press any of the four keys within the track row to put the corresponding track in **focus**. Hold **ALT** and press any of the four keys to cycle though the **tempo-map** modes (see **TRACK PARAMETERS > tempo mapping**). The rightmost focus key is dim if no tempo-mapping is applied, mid-bright the tempo map mode is set to **resize** and full bright if set to **repitch**. Hold **MOD** and press any of the four keys to switch the **buffer**. The two centre keys indicate whether the **main buffer** (left) or the **temporary buffer** (right) is active (see **TAPE PAGE**).

D: Press to toggle **REVERSE** playback for the corresponding track. Hold **ALT** and press the key to activate the **tape warble** effect. A brighter lit key indicates if tape warble is on (see **TRACK PARAMETERS > tape warble**).

E: Press to select the **SPEED** for tracks the corresponding track (+/- 3 octaves). Hold **ALT** + **centre key** to randomize parameters (see **GLOBAL PARAMETERS > randomization**).

F: Press to toggle **PLAYBACK** for the corresponding track. Hold **ALT** and press the key to **mute** the track. Hold **MOD** and press the key to toggle **track select** for the corresponding track.

REC PAGE continued:

Fade-out mode:

- When **REC** is disabled, the track will be overwritten with silence according to the **dub level** value. Higher values result in longer fadeouts as more material is preserved per overwrite.

One-shot recording:

- When **one-shot recording** is enabled for a track, recording starts when the threshold specified in ***global parameters > recording > rec threshold*** is reached. If the track is not playing, the recording will start at the first step. If a track is playing, the recording will start wherever the play-head is. Recording is deactivated after one cycle i.e., the length of the track or current loop.
- If **REC** is pressed **before** the cycle ends the start- and endpoints are calculated, and the according loop is set.
- When **auto-length mode** (**ALT** + **ARM**) is enabled and **REC** is pressed before the end-of-cycle is reached, the track length is set according to the length of the recorded clip (time between **REC** "on" and **REC** "off"). If a track is playing when engaging **auto-length mode**, playback is automatically stopped before recording can start.

Track select mode:

When **track select** is enabled the PLAY key of the corresponding track is slightly brighter than the others. These tracks respond to two additional functions:

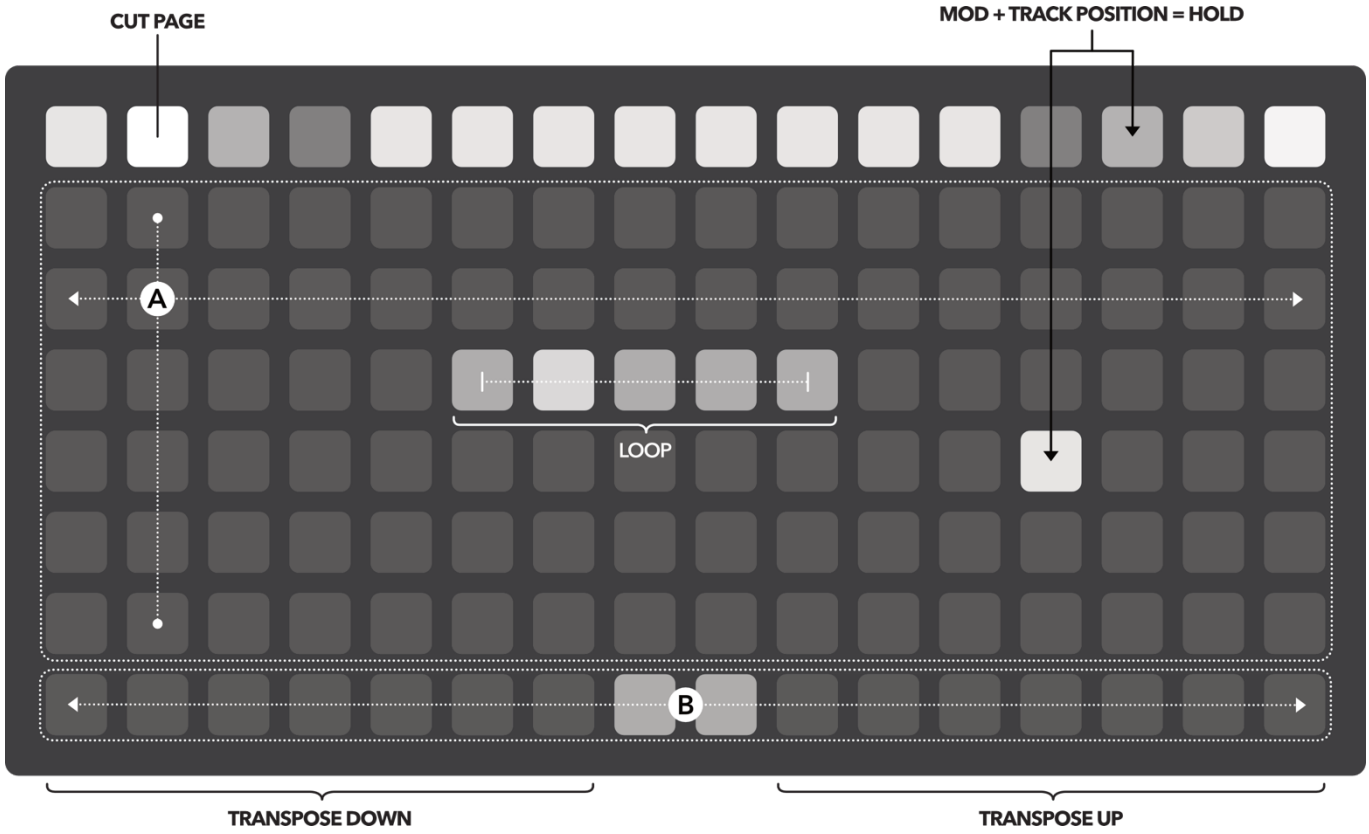
- **ALT RUN** key combo (**ALT** + **STOP ALL**): playing tracks will stop and stopped tracks will play.
- If **randomize @ step count** is enabled in the global settings, specified parameters are randomized after the specified step count (see **GLOBAL PARAMETERS > randomization**).

Tape warble:

All effect parameters can be adjusted per track in the corresponding ***track parameters > track warble*** section.

- **amount [0 - 100%]:** set the chance for a "warble event" to occur (more frequent at higher settings).
- **depth [0 - 100%]:** set how strong the warble effect is (i.e., the effect on playback speed).
- **speed [1 - 10]:** set the speed of the warble LFO (at lower settings the changes in playback speed are slow and at higher settings fast).

CUT PAGE:



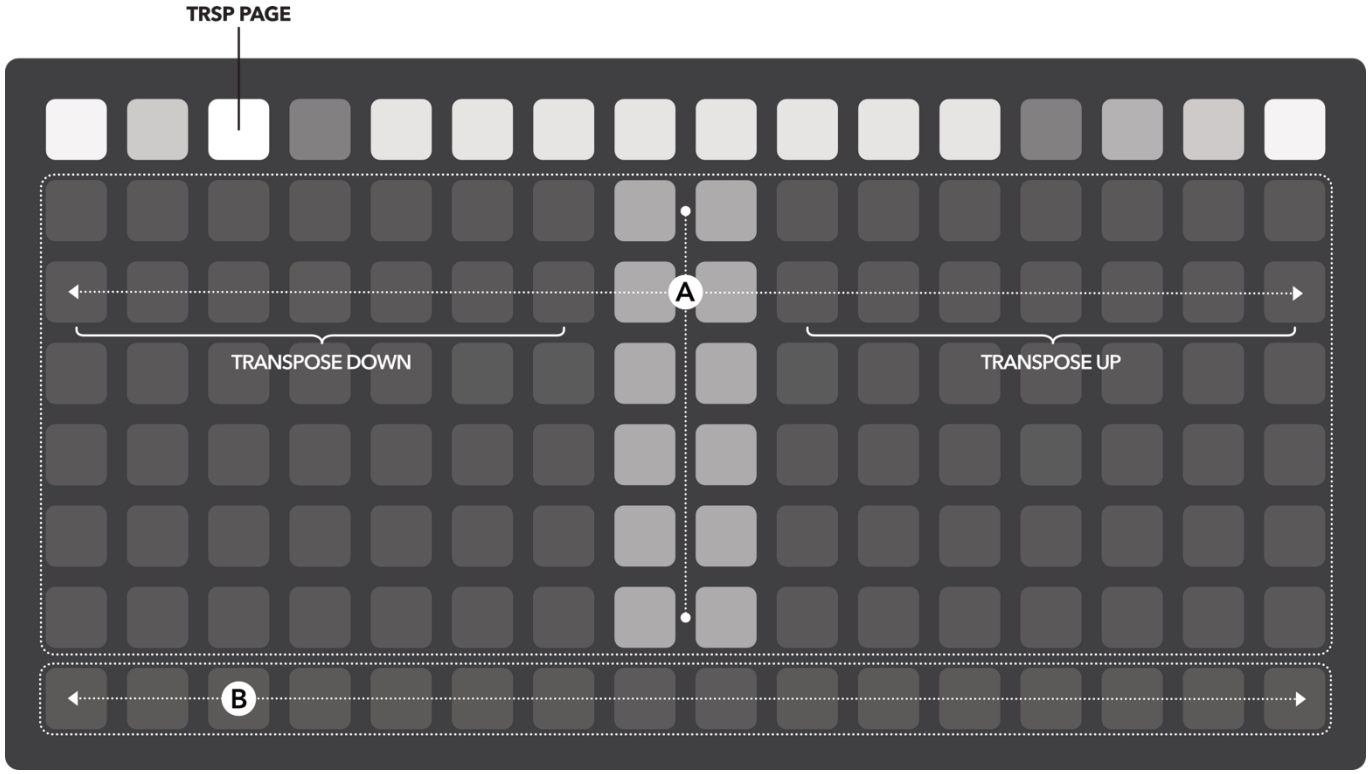
CUT PAGE OVERVIEW:

A: Track playback rows for tracks 1-6. Used to set and display play-head positions.

- **CUT:** Press any key (1-16) of a track row to jump to the corresponding position.
- **LOOP:** Press and hold any key (1-16) of a track row to set start position. Press any other key within the track row to set the loop size. Looping starts when the keys are released.
- **HOLD:** Hold **MOD** and press any key (1-16) to set a one-key-loop (aka **HOLD**). To lock into **HOLD MODE** hold **MOD** and press **ALT**, then release **MOD** before releasing **ALT**. Press **MOD** to unlock.
- **START/STOP:** Hold **ALT** and press any key (1-16) of a track row to start/stop the corresponding track.
- **FOCUS:** Press any key (1-16) of a track row to **focus** the corresponding track. If an arc controller is connected hold the **CUT PAGE** key and turn **ENC 4** to select which track is in **focus** (this allows to set focus without pressing any of the track keys).

B: Transpose the **focused** track (see **TRSP PAGE**).

TRSP PAGE:



TRSP PAGE OVERVIEW:

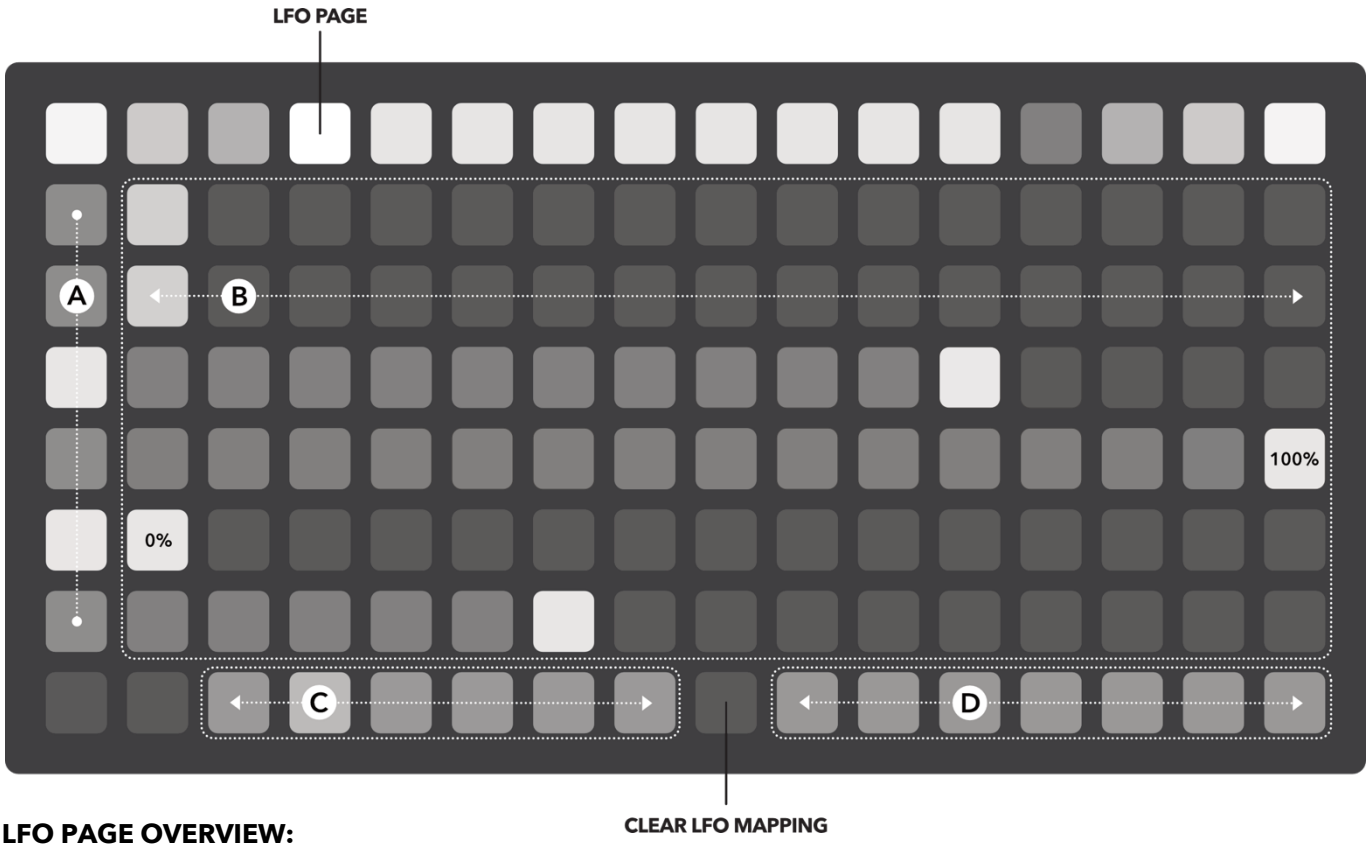
A: TRANSPOSE TRACK 1-6

- Keys 7-1 transpose the track speed **down** and keys 10 -16 transpose the track speed **up**, specified by the scale settings in ***global parameters > scale***.
- **START/STOP:** Hold **ALT** and press a centre key of a track row to start/stop the playback.
- **FOCUS:** Press any key (1-16) of a track row to **FOCUS** the corresponding track.
- **SPEED:** Hold **MOD** and key 8 to decrease **SPEED** or key 9 to increase **SPEED** (see **REC PAGE**).

B: Playback of the **focused** track (see **CUT PAGE**).

LFO PAGE:

The **LFO PAGE** is used to assign any of the 6 LFOs to any of the available destinations. The available destinations are **volume**, **pan**, **overdub**, **detune**, **transpose**, **rate slew** and **filter cutoff** of any of the 6 tracks. Use **ENC1** or alternatively press any key within the LFO rows (2-7) to select the corresponding LFO.



LFO PAGE OVERVIEW:

A: Press key to toggle the **LFO state** (on/off) for LFOs 1-6.

B: Set the **LFO depth** for LFOs 1-6.

C: Select the **track** of destination (1-6)

D: Select **destination** of the **focused LFO**.

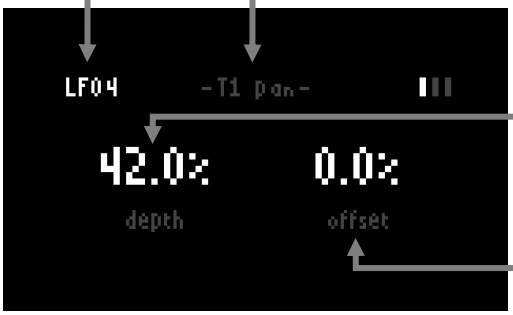
Assigning an LFO to a track destination:

1. Select an **LFO** (via **GRID** or **ENC1**)
2. Select the **track [C]**
3. Select the **destination [D]** → **LFO is now assigned**
4. Adjust **LFO depth [B]** and turn on **[A]**

To unassign an **LFO** press the **CLEAR LFO MAPPING** key.

LFO PAGE PARAMETERS:

While on the **LFO PAGE** norns' screen displays the parameters of the currently **selected** LFO. Use **K2** and **K3** to cycle through the 3 parameter pages and use **ENC2** and **ENC3** to change the corresponding parameter values.

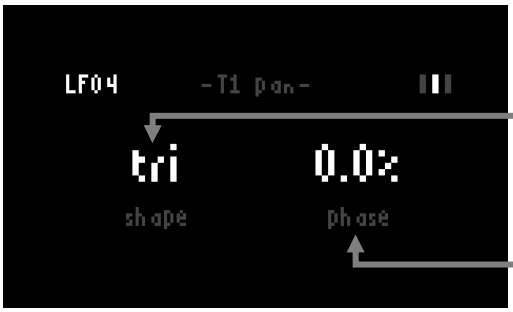


selected LFO

assigned track and destination

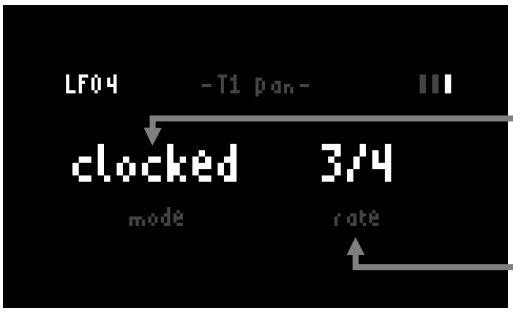
depth [0 – 100%]:
sets the depth of the LFO (at 100% it swings from the minimum to maximum value of the assigned parameter).

offset [-100 – 0%], [-50 – 50%], [0 – 100%]:
sets the deviation from the starting point of the LFO (the offset range depends on the baseline of the assigned parameter).



shape [sine, tri, square, random, ramp up, ramp down]:
sets the waveshape of the LFO.

phase [0 – 100%]:
sets the start phase of the LFO.



mode [clocked, free]:
sets the mode of the LFO (when clocked the LFO rate is a multiple or subdivision of the system clock).

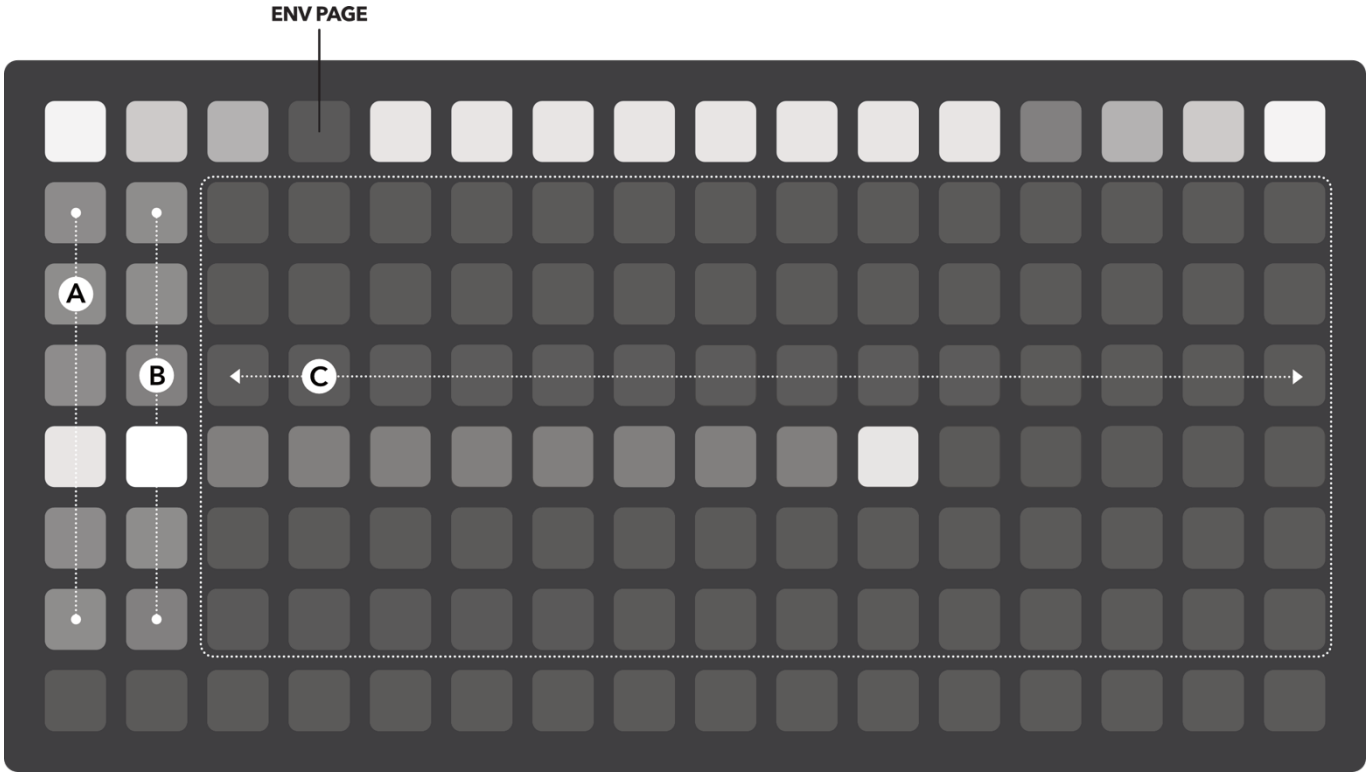
rate [1/16 – 1024 beats], [0.1 – 300s]:
sets the rate if the LFO (the displayed values depend on the LFO mode).

LFO TIPS:

- Map a fast random LFO to dub level and activate recording occasionally for a "degrading loop" effect.

ENV PAGE:

The **ENV PAGE** displays the 6 ADSR envelopes that can control the volume of the corresponding track. Is used to set the parameters of the envelopes, enable/disable them and trigger gate on/off events.



ENV PAGE OVERVIEW:

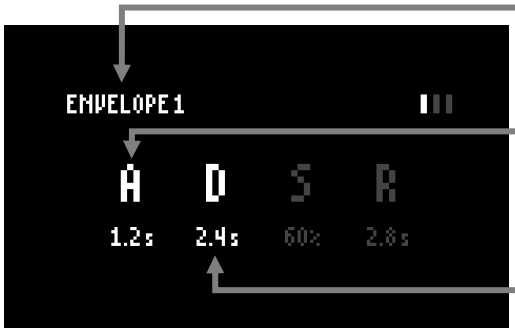
A: Press key to toggle the **STATE** (on/off) for the corresponding envelope. When enabled the track volume will jump to the specified **min volume** (see **ENV PAGE PARAMETERS**).

B: Press key to trigger a **gate on** event and release key to trigger a **gate off** event for the corresponding envelope. While a gate is **on** the **attack** and **decay** segments of the envelope will occur. During the **attack** phase the track volume will change from the **min volume** value to the **max volume** value for the specified **attack** duration. Immediately after the attack phase the track volume will change from the **max volume** to the **sustain level** over the specified **decay** duration. If the key is held the track volume will stay at the specified sustain level. When the key is released the **release** phase of the envelope starts and the track volume drops from the **sustain level** to the **min volume** level over the specified **release** duration.

C: Envelope activity window (displays the track volume if the envelope is enabled).

ENV PAGE PARAMETERS:

While on the **ENV PAGE** norns' screen displays the parameters of the currently **selected** envelope. Use **K2** and **K3** to cycle through the 3 parameter pages and use **ENC2** and **ENC3** to change the corresponding parameter values.



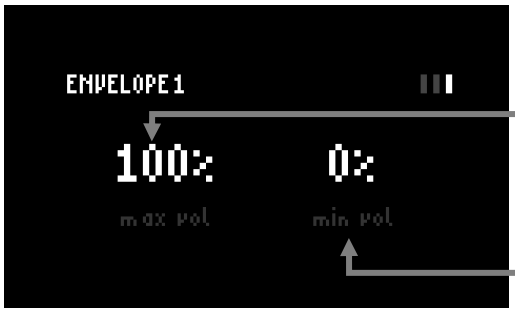
selected ENVELOPE

A [0 – 10s]:
sets the attack duration of the envelope.

D [0 – 10s]:
sets the decay duration of the envelope.

S [0 – 100%]:
sets the sustain level of the envelope (values are clamped according to the min and max volume levels).

R [0 – 10s]:
sets the release duration of the envelope.



max vol [0 – 100%]:
sets the maximum track volume (when the end of the attack phase is reached).

min vol [0 – 100%]:
sets the minimum track volume (when the end of the release phase is reached).

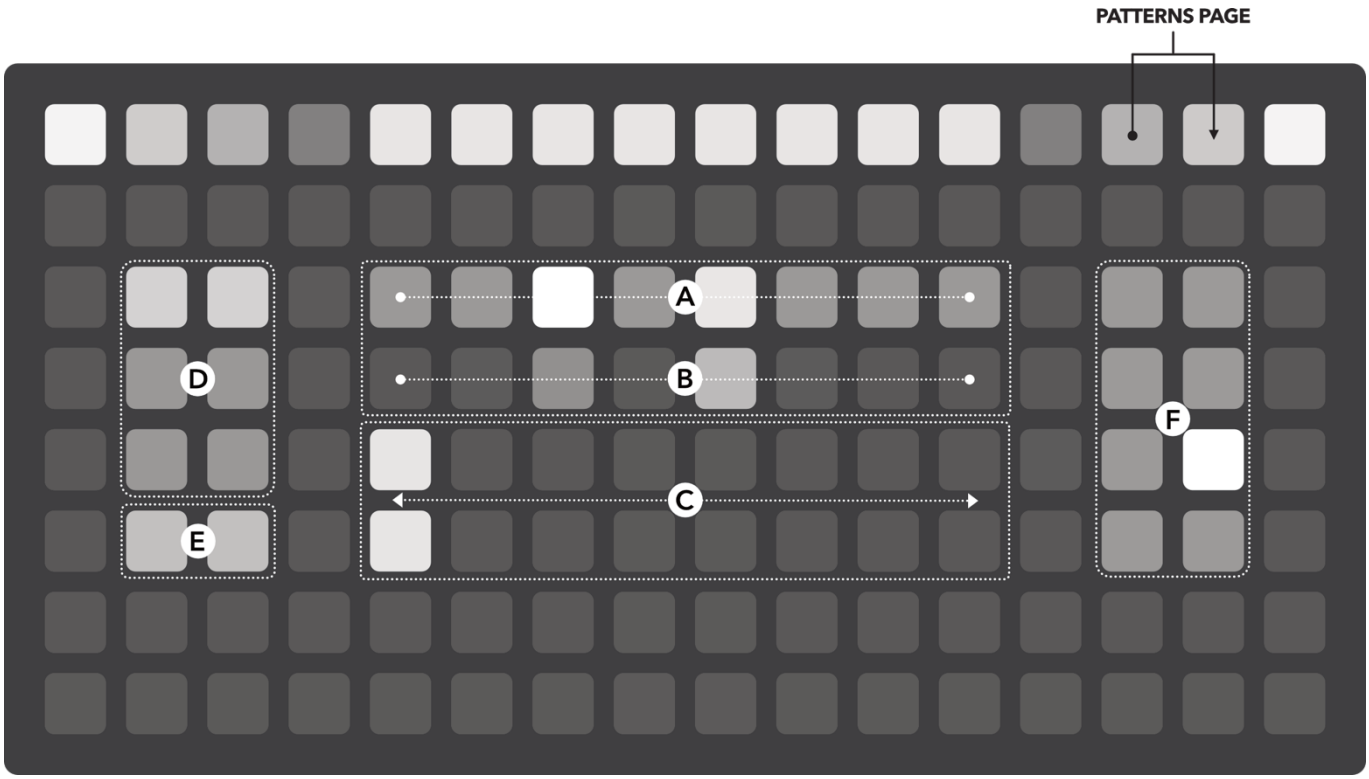
ENV TIPS:

- When a track envelope is enabled gate on/off events are also triggered when pressing a key within the playback row on the **CUT PAGE** or playback row of the **focused** track as found on the **REC-**, **TRSP-** or **TAPE PAGE**.
- Gate on/off events are recorded with patterns.
- Envelopes are re-triggered if a gate on event occurs before the release phase is over.

PATTERNS PAGE:

The **PATTERNS PAGE** is used to setup the behaviour of the **MACRO** keys, enable/disable clock synced patterns, set pattern parameters, and set the key quantization value.

In total there are 8 **PATTERN**, 8 **MANUAL RECALL** and 8 **SNAPSHOT** slots available. The 8 **MACRO** keys can be configured to work as either **4 patterns / 4 recall** slots, **8 pattern** slots or **8 recall** slots. The configuration can be selected either via grid (**D**) or under ***global parameters > macros***. When a grid 256/zero is used the upper **GRID NAVIGATION** row displays 8 pattern slots and the lower row 8 recall slots. For more info about pattern recording and recalls see **MACRO RECORDING AND PLAYBACK**.



PATTERNS PAGE OVERVIEW:

A: Press key to enable/disable pattern **SYNC** for the corresponding pattern slot (1-8).

B: If pattern **SYNC** is enabled key presses toggle between the pattern launch modes (see **PATTERNS PARAMETERS**).

C: Select which pattern is **focused**.

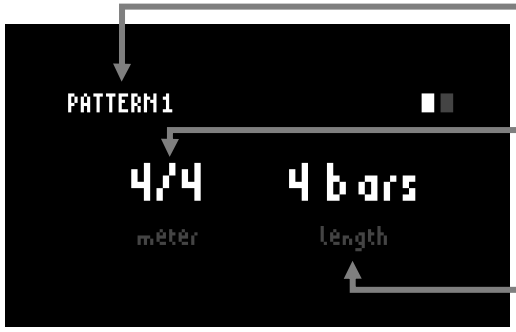
D: Select between different macro key configurations: top row [split view], centre row [patterns only], bottom row [recalls only]. This section is deactivated when a grid 256/zero is used.

E: Toggle between **MANUAL RECALLS** and **SNAPSHOTS**.

F: Select the key quantization value [1bar – 1/32]. The value is briefly displayed on the screen.

PATTERNS PAGE PARAMETERS:

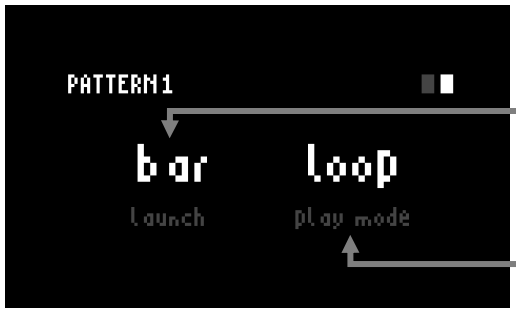
While on the **PATTERNS PAGE** norns' screen displays the parameters of the currently **selected** pattern slot. Use **K2** and **K3** to cycle through the 2 parameter pages and use **ENC2** and **ENC3** to change the corresponding parameter values.



selected PATTERN

meter [2/4, 3/3, 4/4, 5/4, 6/4, 7/4, 9/4, 11/4]:
if pattern **SYNC** is enabled the meter of the pattern can be selected (otherwise "**–**" is displayed).

length [1 – 64 bars]:
if pattern **SYNC** is enabled the length of the pattern can be selected (otherwise "**free**" is displayed).



launch [free, beat, bar]:
sets the launch mode of a pattern slot (when set to free, the pattern starts immediately, otherwise pattern playback starts at the next beat / bar of the system clock).

play mode [loop, oneshot]:
sets the pattern play mode (when set to oneshot, pattern playback stops after one cycle).

MACRO RECORDING AND PLAYBACK:

MANUAL RECALLS:

- Each **RECALL** slot can **store** specified key states. Key presses for **LFO** are not stored.
- Press an empty **RECALL** slot to **arm** (indicated by a fully lit pad).
- Press keys that you wish to store the state of. Press the **RECALL** slot again to **store** the key states (slots with data are slightly less bright than armed slots).
- Press the corresponding **RECALL** slot to recall stored key states.
- Hold **ALT** and press a **RECALL** slot to clear.

SNAPSHOTS:

- Press an empty **RECALL** slot to **save** a **snapshot** (populated slots (contain data) are brighter than empty slots).
- Press a populated **RECALL** slot to **recall** the **snapshot**.
  - ▷ Set snapshot options under ***parameters > macros***.
- Hold **ALT** and press a **RECALL** slot to clear.

PATTERNS:

Each **PATTERN slot** can store and loop a sequence of key presses. Key presses for **LFO** are not recorded.

- Press an empty **PATTERN slot** to **arm** recording (indicated by a fully lit pad).
- Enter a sequence of key presses. Recording starts as soon as the first key press is registered and is indicated by a flashing **PATTERN slot**.
  - ▷ If pattern **SYNC** is **enabled**, recording will automatically end after the specified duration and continue with pattern playback (if playback mode is set to loop).
  - ▷ If pattern **SYNC** is **disabled**, then the **PATTERN slot** needs to be pressed again to end **PATTERN recording** and continue with pattern playback (if playback mode is set to loop).
- To **ADD** key presses (overdub) to a playing **PATTERN**, hold **MOD** and press the **PATTERN slot** (corresponding key flashes to indicate that recording is enabled). Additional key presses are added to the current looping pattern.
  - ▷ Press the **PATTERN slot** again to store the added key presses, disable recording and continue **PATTERN** playback.
  - ▷ To **UNDO** any added key presses, hold **MOD** and press the flashing **PATTERN slot** whist recording is still enabled. The pattern will revert to its original sequence (pre overdub) after the pattern loop restarts.
- Hold **ALT** and press the corresponding **PATTERN slot** to **clear** the pattern.

PATTERN TIPS:

- ▶ If pattern **SYNC** is enabled and **PATTERN** recording is started off-grid, the playback position will be reset in time with the system clock after one cycle.
- ▶ If pattern **SYNC** is enabled the length of a pattern can be changed even after a pattern has been recorded.
- ▶ Pattern **SYNC** can be enabled after a pattern has been recorded in **free** mode. The pattern is then looped according to the meter/length settings.

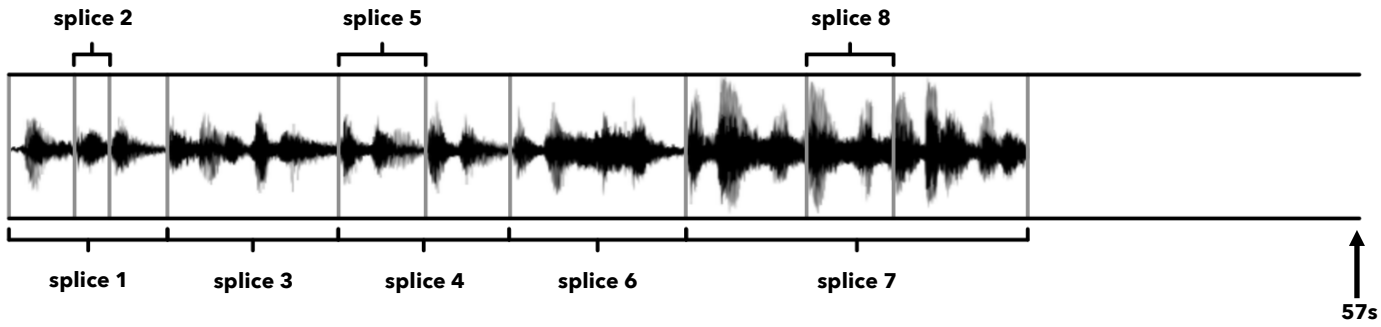
TAPE PAGE:

The **TAPE PAGE** is used to set up all "audio management" for the 6 tracks and can be used to load previously saved sessions (psets).

TAPE CONCEPT:

Each track has a total of **57s** of buffer available to record and/or load audio material into. This buffer is referred to as the **track tape**. The **active playback window** of a track is specified by a **tape splice**. Each track has 8 different splices available, which point to different parts of the track tape. A track can be set to play back any of the 8 splices at any given time (also, switching splices can be recorded by patterns). Tape splices may overlap, have different lengths, and represent **any** portion of the track tape.

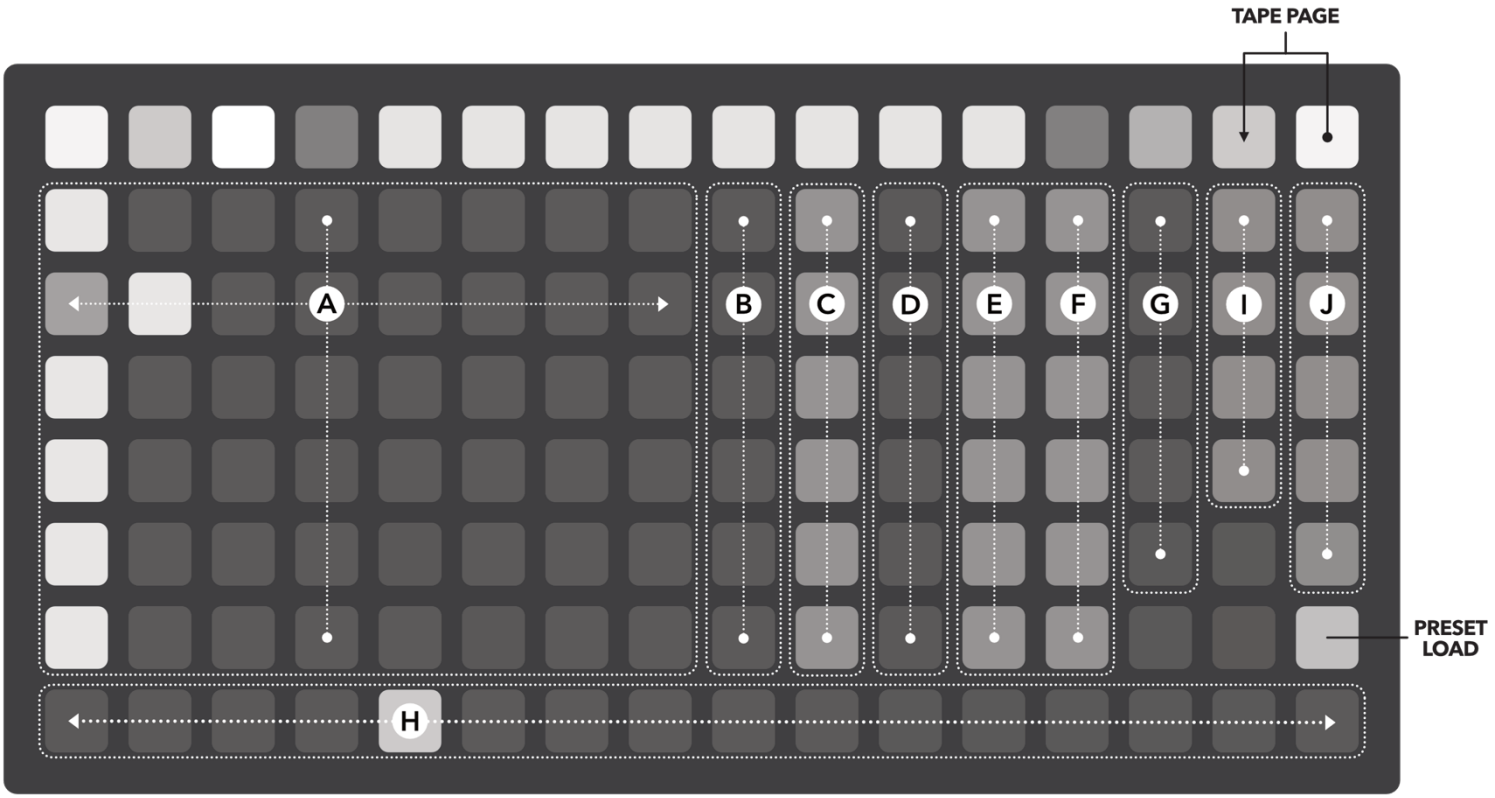
Example:



It is possible to import/export audio to/from tape splices, delete splices, copy splices, and paste them to other splices of the same track or different tracks. It's important to keep in mind that if splices overlap, deleting a splice will result in deleting parts of another splice. For example, if splice 8 in the example above were deleted, it would result in a gap of silence within splice 7. Also, plan ahead when importing audio files e.g.: In the example **splice 1** above has a length of **4.2s**. **Splice 2** is a subset of **splice 1** and has a length of **1.1s**. If a **6s** audio file is imported to **splice 2**, all audio from the start-point of **splice 2** + **6s** will be replaced, resulting in overwriting parts of splice 1 and splice 3. For more information about placing and moving splice markers see **TAPE INTERFACE**.

Each track tape has two sides (like two sides of a tape), which are referred to as the **main buffer** and the **temporary buffer**. It is possible to switch between the main and temporary buffer and copy splices from one side to the other. The main buffer is saved to disk together with a **pset** and the temporary buffer is discarded when the script is closed. The initial idea behind the temporary buffer was to have the possibility to save "backups" of recordings before overdubbing, which makes it possible to revert to the previous recording if required.

TAPE PAGE OVERVIEW:



A: Press a key to **select** a **splice** 1–8 (columns) of the corresponding track 1-6 (rows). The highlighted row displays which track is **focused** and the dimly lit key which **splice** is **selected**. A brightly lit key indicates which **splice** is **active**.

- ▷ Hold **ALT** and press a **splice** key to set the **active SPLICE** of the corresponding track. The play head will immediately jump to that part of the tape and the track's start and endpoint are set accordingly.
- ▷ Hold **MOD** and press a **splice** key within a track row to copy the active buffer of the **selected SPLICE** to the non-active buffer.

B: Hold to display the whole track tape in the **splice window**. This is referred to as **tape preview** and can be useful to get an idea of how much space on the track tape is left.

C: By default, this section displays the tempo-mapping of the tracks 1-6.

- ▷ Hold **ALT** and press the corresponding key to cycle through the **tempo-map-modes**. The key brightness indicates whether a track is not tempo-mapped (dim) or set to **resize** (mid bright) or **repitch** (bright). The tempo-map-modes (resize and repitch) are also indicated on the screen.
- ▷ Hold **MOD** to display which is the active buffer of the track tape. Press the corresponding key to switch between buffers (bright key → **main** buffer, dim key → **temporary** buffer).

D: Hold to display the **splice info** (file name, length / repitch value).

E: Press key to toggle the **left input** channel on/off. A bright key indicates that the input is enabled.

F: Press key to toggle the **right input** channel on/off. A bright key indicates that the input is enabled.

G: Hold to display the **track send levels** and set the send values with **ENC2** and/or **ENC3** accordingly.

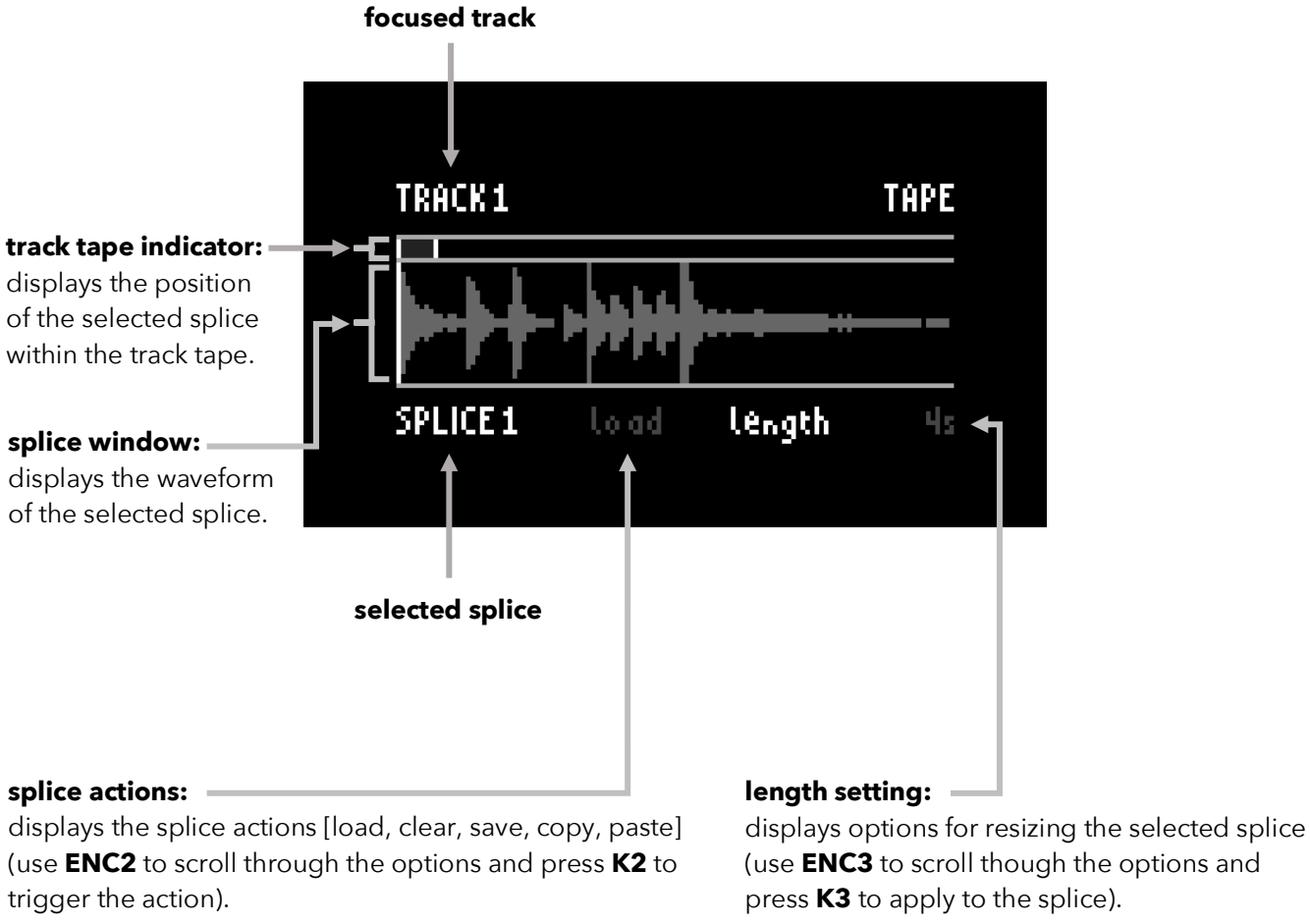
H: Playback of the **focused** track (see **CUT PAGE**).

I: Press the key to toggle **TRACK 5 SEND** to internally route the corresponding track (1-4) to track 5.

J: Press the key to toggle **TRACK 6 SEND** to internally route the corresponding track (1-6) to track 6.

TAPE INTERFACE:

While on the **TAPE PAGE** norns' screen displays the interface for managing the **track splices** / audio content.



Trimming Splices:

Splices can be set to any position and size within the available track tape. Each splice contains a set of **splice markers** which define the **start** and **end** position within the track tape. The splice length can be set via length parameter and/or trimmed manually:

- ▷ While **K1** is **held**, turn **ENC2** to set the **start** position and **ENC3** to change the **length** of the **selected splice**.
- ▷ While **K1** is held press **K2** to **SET** the **default** splice markers and **K3** to **RESET** the splice according to the **default** splice markers.

Splice Actions:

Use the splice actions to **load**, **clear**, **save**, **copy**, and **paste** splice audio to and from tape splices:

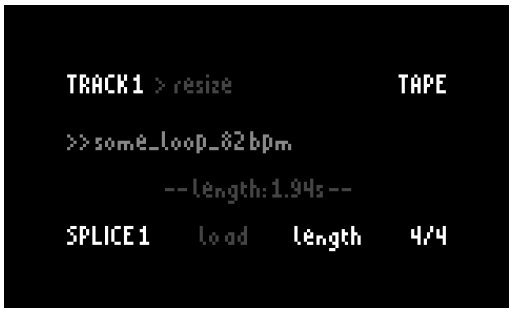
- **load**: Loads an audio file (mono, 48kHz) into the selected splice. The length of the **selected splice** will be set according to the length of the file and the **default splice markers** saved. The maximum file length is: **57s – splice start position**. If the file is too long a warning message will be displayed.
- **clear**: Clears the selected splice. **Warning**: clearing audio will affect all splice markers that share the cleared region.
- **save**: Save the selected splice to norns' hard drive (mono, 48kHz, .wav).
- **copy**: copies the **selected splice** to the clipboard.
- **paste**: pastes the splice stored on the clipboard to the **selected splice**.

Length Settings and Tempo-Mapping:

By default, tracks are **not** tempo-mapped. The **length setting** displays discrete lengths in seconds and splice length is set manually, defaulting to 4s. When a track is **tempo-mapped** the track length **or** playback speed are calculated according to the system tempo settings and **tempo-map-mode**. The length setting displays measures (1/4, 2/4, 3/4, 4/4 etc..) instead of seconds. There are two tempo-map-modes:

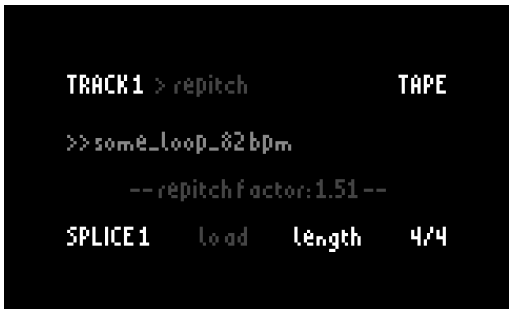
Resize:

The lengths of the track splices are re-sized according to the measure selected in the length settings. Example: If the clip length setting is set to 4/4 (1 bar) the splice length will be re-sized to 1 bar at the current system tempo. In this example norns' system tempo is set to 124bpm, which results in a splice length of 1.94s (1 bar at 124bpm ~ 1.94s). Use this temp-map-mode is when you want the splices to preserve their original pitch.



Repitch:

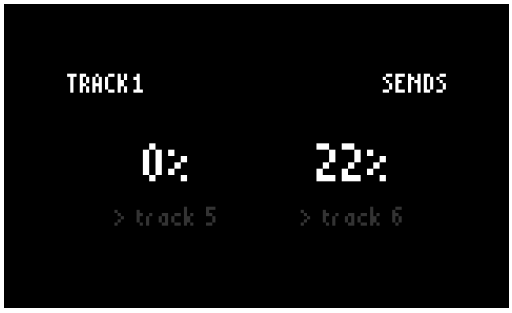
If tempo-map mode is set to **repitch** the lengths of the splices are preserved. However, the **playback speed** of the splices is recalculated according to the measure selected in the length settings. Example: if the system tempo is set to 124bpm the playback speed of a 1-bar clip, that was recorded at 82bpm will be 1.51 x faster, as the original splice length of 2.93s (1 bar at 82bpm) needs to be played back within 1.94s (1 bar at 124bm).



N.B.: Lower repitch factors will result in lower play-head speeds and the audio quality will be degraded. If you wish to record audio it is advised to set the tempo-map-mode to **resize** and **not repitch**.

Track Sends:

The output of tracks 1 - 4 can be internally routed to the input of track 5 and the outputs of tracks 1 - 5 to the input of track 6. Track routing is post-filter and post-fader, and the send levels can be set for each track independently. The send levels are set by holding the corresponding key **[G]** (see **TAPE PAGE OVERVIEW**) and turning **ENC2** and **ENC3** to set the send levels to **track 5** and to **track 6** respectively. Track routing can be turned on/off by pressing the corresponding keys **[I]** and **[J]** (see **TAPE PAGE OVERVIEW**).



PRESET LOADING:

The loading of psets can be accessed directly via grid on the **TAPE PAGE**. Press the "**PRESET LOAD**" key to toggle the **PRESET LOADING** page. The screen displays the names of the saved psets and two options for loading.

Displays the saved psets. Turn **ENC2** or **ENC3** to select a preset.

silent:
Press **K3** load a preset in the background. Hold **K1** and press **K3** to load a preset in the background **and** set the system clock to the clock tempo of the preset (see **Silent Loading**).

bang!:
Press **K2** to instantly load a preset (this is equivalent to loading a pset via pset-menu).

Silent Loading:

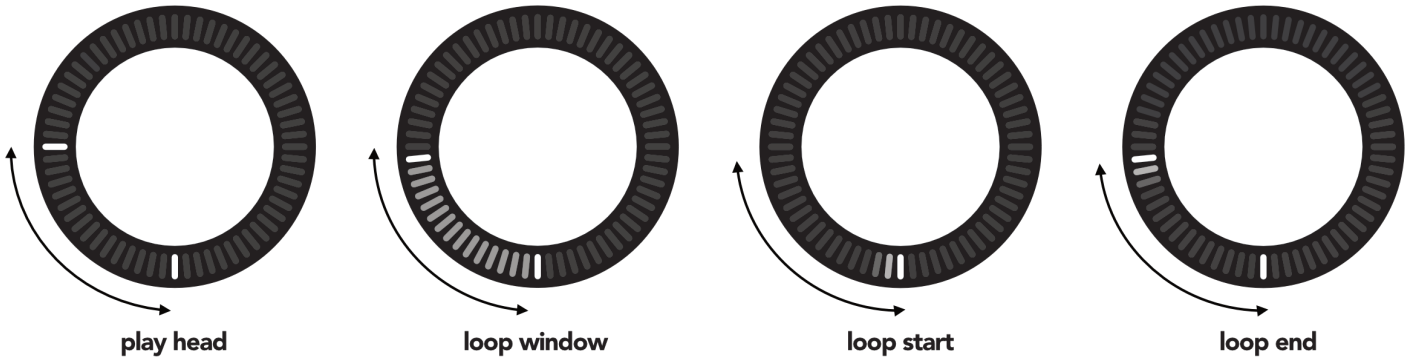
This preset option is intended for creating smooth transitions between different presets in a live situation. When loading a pset "silently" the whole stored buffer of the preset is copied to the **temporary** buffer (in the background) and all **patterns**, **recalls**, and **tempo-map** settings are loaded immediately. All other parameters will not be affected (track levels, pan, cutoff, sends, lfos etc…) unlike a traditional preset load.

- If a track is **stopped** the track tape is immediately copied over to the main buffer.
- If a track is **playing**, then the play head key (on the **CUT PAGE**) and focus key (on the **REC PAGE**) flash to indicate that the track tape is not loaded yet. Pressing any key within the playback row of a track will load the track tape and set the active splice to splice 1. Track transposition and speed are reset to default settings.
- If the clock tempo is loaded together with the silent load norns' system clock will be set accordingly if norns' clock is set to **internal** or **link**.

ARC CONTROLS:

While on the **REC-**, **CUT-** or **TRSP PAGE** there are two arc pages available: **PLAY** and **LEVELS**. Hold **K1** and press **K3** to switch between pages. On the **LFO-**, **ENV-** and **TAPE PAGE** page-specific controls are displayed and on the **PATTERNS PAGE** arc controls are disabled. The orientation of the arc controller can be selected under ***global parameters > arc settings***. Note that the ***arc settings*** are only visible if an arc controller is connected (hot plugging supported).

PLAY

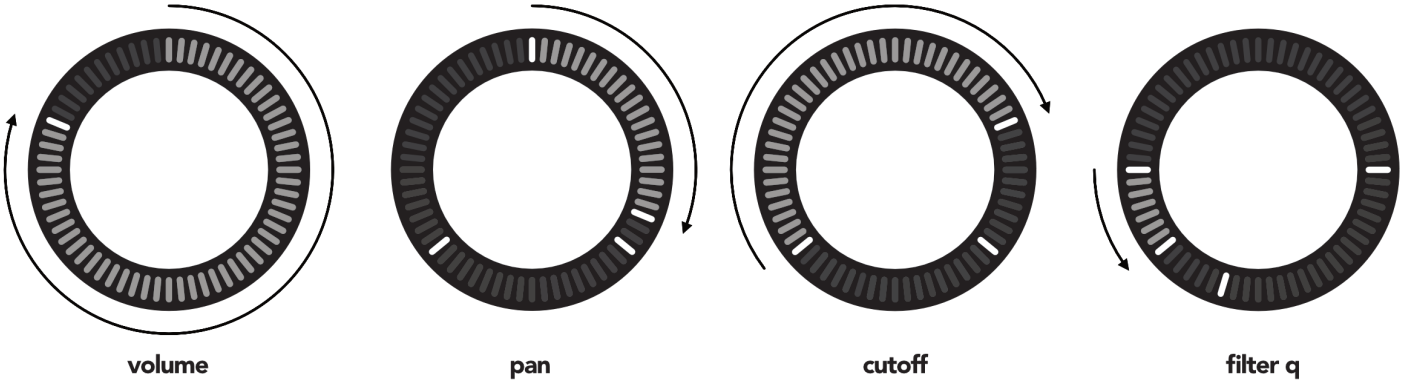


- **ENC 1 – play-head:** The play-head encoder ring displays the position of the play-head at a 64-step resolution. The indicator rotates CW for tracks playing forward and CCW for tracks playing in reverse. **ENC 1** has different functions depending on the settings found under ***global parameters > arc settings:***
  - **enc1 > start [off, on]:** If **on** moving the encoder will start playback of the focused track.
  - **enc1 > direction [off, on]:** If **on**, rotating the encoder CW will set the playback direction of the focused track to forward and rotating the encoder CCW will set the playback direction to reverse.
  - **enc1> mod [off, warble, scrub]:** If set to **warble**, moving the encoder will temporarily speed up/slow down the playback speed of the focused track. If set to **scrub**, moving the encoder will scrub through the clip of the focused track. The **scrub sensitivity** can be set under ***global parameters > arc settings***.
- **ENC 2 – loop window:** The loop window encoder ring displays the loop window of the focused track. If looping is active the loop window is gradually adjusted by moving the encoder. If looping is inactive, moving the encoder will activate looping. (Any further encoder movements are ignored for 0.5s. This brief time-out prevents accidental loop window changes while activating loops via arc.) To disactivate looping hold **ALT** (on the grid) and move the encoder.
- **ENC 3 – loop start:** Set the start point of the loop window.
- **ENC 4 – loop end:** Set the end point of the loop window.

N.B. While recording a pattern when **quantization** is **on** you may experience jumps when moving the loop window, start and end points because the loop positions are called according to the key quantize settings. Also, as the loop window, loop start and loop end points can be set in much smaller increments as the grid, the keys displaying playback position might be a bit off or flicker. This is expected behaviour.

While in **CUT VIEW** holding the **CUT VIEW** key will display the focused track on the encoder ring of **ENC 4**. Turn **ENC 4** to select the focused track.

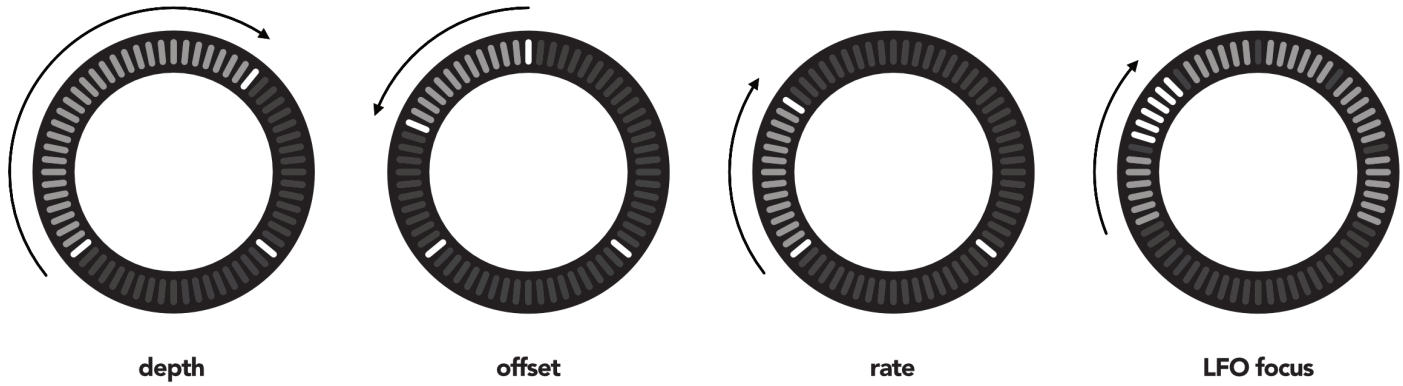
LEVELS



- **ENC 1 – volume:** Set the volume of the focused track. Increase volume by turning the encoder CW.
- **ENC 2 – pan:** Set the pan of the focused track.
- **ENC 3 – cutoff:** Set the filter cutoff of the focused track. Increase frequency by turning the encoder CW.
- **ENC 4 – filter q:** Set the filter q of the focused track. Decrease the q value by turning the encoder CW. Indicators represent filter q values of 4, 2, 1 and 0.1.

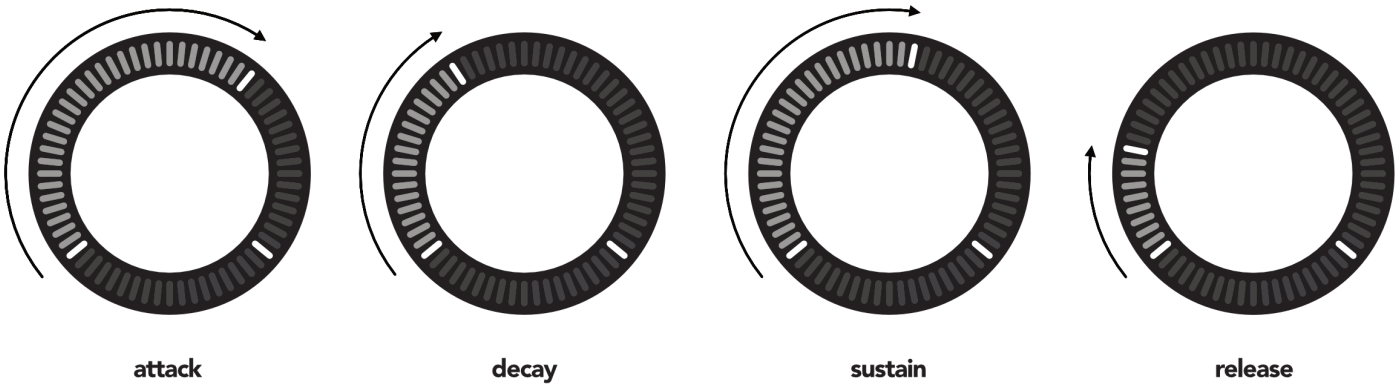
While in **CUT VIEW** holding the **CUT VIEW** key will display the focused track on the encoder ring of **ENC 4**. Turn **ENC 4** to select the focused track.

LFO



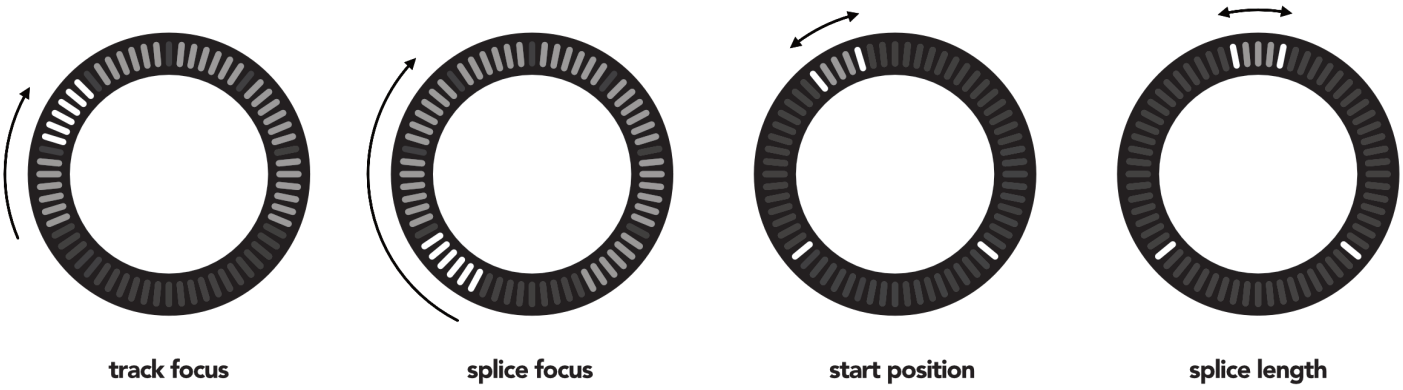
- **ENC 1 – depth:** Set the depth of the focused LFO. Increase the depth by turning the encoder CW. Setting the depth to values > 0 will automatically turn the LFO on. Turning the encoder fully CCW will turn the LFO off.
- **ENC 2 – offset:** Set the offset of the focused LFO.
- **ENC 3 – rate:** Set the frequency of the focused LFO. Increase frequency by turning the encoder CW.
- **ENC 4 - focus:** Turn the encoder to set which LFO is in focus.

ENV



- **ENC 1 – attack:** Set the attack time.
- **ENC 2 – decay:** Set the decay time.
- **ENC 3 – sustain:** Set the sustain level.
- **ENC 4 - release:** Set the release time.

TAPE



- **ENC 1 – track focus:** Turn the encoder to select the focused track.
- **ENC 2 – splice focus:** Turn the encoder to select a splice.
- **ENC 3 – start position:** Turn the encoder CW to increase or CCW to decrease the start position of the selected splice.
- **ENC 4 – splice length:** Turn the encoder CW to increase or CCW to decrease the length of the selected splice.

PARAMETERS:

The parameters are divided three main sections: **global**, **tracks** and **modulation**. Most track and modulation parameters are accessible over the grid / main screen interface. Most global parameters are only available over the parameter menu. All parameters are MIDI-mappable.

GLOBAL PARAMETERS:

save tempo [no, yes]:

- When **save tempo** is enabled norns system clock will be set to the saved tempo when the pset is loaded **if** norns' system clock is set to **internal** or **link**.

scale [list of scales]:

- mlre comes with a selection of predefined scales for track transposition to choose from: **major**, **natural minor**, **harmonic minor**, **melodic minor**, **dorian**, **phrygian**, **lydian**, **mixolydian**, **locrian** and **custom**. The transposition steps of the transpose parameter correspond to the selected scale.

  custom scales:

  Scales can be easily modified in the ***mlre_scales.lua*** file found under ***dust/mlre/lib script***. Transposition steps are defined as cents in the **trsp_scale** table. The values displayed on the screen are set in the **trsp_id** table. The values which are displayed don't affect the transposition function. The number of scales specified is "unlimited", however, the format must be kept. The index of the scale name specified in the **scale_options** table points to index of the **trsp_id** and **trsp_scale**. All scales consist of 15 steps (centre reference → index 8 == no transposition). For clarity the indexing is highlighted in different colours in the example below.

  example:

```
--scale names (these are displayed in the params menu)
local scale_options = {"major", "minor", "custom"}

--transposition step id (these are the values displayed)
local trsp_id = {
{"-P8","-m7","-m6","-P5","-P4","-m3","-m2","none","M2","M3","P4","P5","M6","M7","P8"},
{"-P8","-m7","-M6","-P5","-P4","-M3","-M2","none","M2","m3","P4","P5","m6","m7","P8"},
{"type","your","own","notation","here","the","values","don't","really","matter",
"except","the","number","of","values"}}

--steps in cents (these are the transposition steps in cents, 8th value is 0)
local trsp_scale = {
{-1200,-1000,-800,-700,-500,-300,-100,0,200,400,500,700,900,1100,1200},
{-1200,-1000,-900,-700,-500,-400,-200,0,200,300,500,700,800,1000,1200},
{-3100,-2400,-1900,-1700,-1200,-700,-500,0,500,700,1200,1700,1900,2400,3100}}
```

GLOBAL PARAMETERS continued:

recording:

▷ **rec source [adc/eng, adc/tape, eng/tape, adc/eng/tape]:**
Set the input sources for recording.

▷ **rec threshold [-40 - 0dB]:**
Set the threshold of the incoming audio signal for one-shot recording to start (see **REC VIEW**).

▷ **rec slew [1 - 10ms]:**
Adjust the rec slew time of the rec-heads. Higher values result in less clicks but more of the transients are lost.

macros:

▷ **macro slots [split, patterns only, recall only]:**
Specifies how the eight keys are allocated (has no effect when a grid 256/zero is connected). If the macro slots are set to either **patterns only** or **recall only** it is possible to switch between the two settings via the norns interface: press and hold **K1** and press **K2** to switch between the two settings. This key combo only works on the **REC-**, **CUT-** and **TRSP PAGES**.

- **split:** Macro slots 1-4 are patterns, macro slots 5-8 are recalls.
- **patterns only:** Macro slots 1-8 are patterns.
- **recall only:** Macro slots 1-8 are recalls.

▷ **recall mode [manual recall, snapshot]:**
Specifies whether recalls are **manual recalls** or **snapshots**.

- **manual recall:** Manual recalls behave as in the original mlr script where single key presses are specified and then stored in the according recall slot.
- **snapshot:** Snapshots store and recall specific track information for all 6 tracks. A snapshot captures playback state, mute state, playback position, loop settings, speed, reverse and transposition at a specific point in time.

▷ **playback state [ignore, state only, state & pos]:**

- **ignore:** playback state (playing / stopped) and play head position are not recalled with a snapshot.
- **state only:** playback state is recalled with a snapshot but not play head position.
- **state & pos:** playback state and play head position are recalled with a snapshot.

GLOBAL PARAMETERS continued:

midi settings:

- **midi device [device list]:** Set the MIDI device to send MIDI start/stop messages to.
- **midi transport [off, send, receive]:** Set whether MIDI start/stop messages are sent or not. If set to "**send**" a start message will be sent as soon as track playback of any track is started. All consecutive track starts are ignored until a MIDI stop message is sent. To send a MIDI stop message press **STOP ALL**. If set to receive a midi start message will start all tracks and a midi stop message will stop all tracks and playing patterns.

track control:

The purpose of this parameter section is for MIDI mapping specific track parameters that otherwise are only available via grid interface. The listed parameters can be triggered via MIDI controller once they've been mapped:

- **global control:**
  - **start all:** starts all tracks.
  - **stop all:** stops all tracks.
  - **stop all key [off, on]:** enables/disables the stop all key (see **GRID NAVIGATION**).

- **focused track control:**
  playback, **mute**, **record**, **reverse**, **speed +** (increase speed) and **speed -** (decrease speed). Triggering the corresponding parameters via MIDI controller affect the currently **focused** track.

- **individual track control:**
  same parameters as focused track control but for the individual tracks.

randomization:

- **randomize @ step count [off, on]:** If enabled and **track select** is active for a given track the specified parameters are randomized after the number of grid steps specified in **>>step count**.
- **>>step count [1 - 128]:** Set the number of steps between randomization events for **randomize @ step count**.
- **parameters**: The following section allows the specification of the parameters that are randomized: **transposition**, **volume**, **pan**, **reverse**, **loop-points**, **speed** (octaves) and **cutoff frequency**. The bounds of **speed** (octaves) and **cutoff** can be specified. By default, direction, loop-points, and speed are enabled.

N.B.: Track parameters can be randomized manually by holding **ALT** and pressing the **centre SPEED** key of the corresponding track.

GLOBAL PARAMETERS continued:

arc settings:

The arc settings parameters are only displayed if an arc controller is connected.

- ▷ **arc orientation [horizontal, vertical]:** Set the orientation of the arc controller (horizontal or vertical).
- ▷ **enc1 > start [off, on]:** If enabled touching the encoder will start playback of the focused track.
- ▷ **enc1 > direction [off, on]:** If enabled, rotating the encoder CCW will set the playback direction to forward and rotating the encoder CW will set the playback direction to reverse of the focused track.
- ▷ **enc1 > mod [off, warble, scrub]:** If set to warble, moving the encoder will temporarily speed up/slow down the playback speed of the focused track. If set to scrub, moving the encoder will scrub through the clip of the focused track.
- ▷ **scrub sensitivity [1 - 10]:** Set the sensitivity of the encoder. Lower values result in less sensitivity i.e., the scrubbing effect is less pronounced (the play-head moves less compared to higher sensitivity values).

TRACK PARAMETERS:

The track parameters are divided into seven sections: **options**, **levels**, **pitch**, **filter**, **warble**, **envelope**, and **trigger**.

options:

- ▷ **buffer [main, temporary]:** set the active buffer (see **TAPE PAGE**).

  play mode [loop, oneshot, gate]: set the play mode. When in **oneshot** and **gate** mode making sub-loops within a track row overrides the behaviour and always loops.

  - **loop:** default setting. When the play head reaches the end of the track it jumps to the beginning.
  - **oneshot:** when the play head reaches the end of a track playback is stopped.
  - **gate:** playback starts when a key within the track row is pressed and stops when the key is released. When starting playback via **playback** key (see **REC PAGE**) gating is ignored. **N.B.:** While recording a pattern when **key quantization** is **on** track playback is triggered according to the key quantization-settings. This means when you hold a key, playback will start at the next quantize event and when you release a key, playback will stop at the next playback event. Depending on the key quantization settings fast key presses might not be registered as expected.
- ▷ **tempo map [off, resize, repitch]:** set the tempo-map mode (see **TAPE PAGE**).
- ▷ **track launch [free, beat, bar]:** sets the start launch behaviour.
  - **free:** when the start key is pressed or a key within the track row playback starts immediately.
  - **beat:** playback starts on the next beat (synced to norns' system clock).
  - **bar:** playback starts on the next downbeat (synced to norns' system clock).

TRACK PARAMETERS continued:

- ▷ **track reset [off, on]:** enables/disables track reset behaviour. When track reset is enabled the track play head is reset to the start position after the number of beats specified under **reset count**. The counter starts as soon as track playback starts and is reset when a track is stopped. Enabling track reset forces the track to stay in time with the system clock. Use in combination with **track launch** set to either **beat** or **bar** for best results. **N.B.:** track reset is temporarily disabled when a track is not loaded (when loading preset with **silent load**).
- ▷ **reset count [2 - 128 beats]:** if track reset is enabled the start position is reset after the specified number of beats (synced to the system clock).

levels:

- ▷ The levels section displays parameters for: **volume**, **pan**, **dub level**, **rec level**, **rate slew**, **level slew**, **send trk 5**, and **send trk 6**.

pitch:

- ▷ **detune [-600 - 600 cents]:** change the base playback speed in cent steps to finetune tune the track pitch.
- ▷ **transpose [scale degrees]:** change the playback speed in scale-dependent increments.

filter:

- ▷ **cutoff [20 - 18000 Hz]:** set the cutoff frequency of the filter.
- ▷ **filter q [0.01 - 4]:** set the filter q (lower values result in higher resonance).
- ▷ **filter type [lp, hp, bp, br, off]:** select the filter type (low pass, high pass, band pass, band reject) or bypass the filter (off).
- ▷ **dry level [0 – 100%]:** set the amount of dry signal that is mixed post filter (has no effect when the filter is turned off).

warble:

- ▷ **active [no, yes]:** enable/disable the tape warble effect.
- ▷ **amount [0-100%]:** set the chance for a "warble event" to occur (more frequent at higher settings).
- ▷ **depth [0-100%]:** set how strong the warble effect is (i.e., the effect on playback speed).
- ▷ **speed [1-10]:** set the speed of the warble LFO (at lower settings the changes in playback speed are slow and at higher settings fast).

TRACK PARAMETERS continued:

envelope:

- ▷ **envelope [off, on]:** enable/disable the track envelope.
- ▷ **max vol [0 -100%]:** set the maximum track volume (end of attack).
- ▷ **min vol [0 - 100%]:** set the minimum track volume (end of release).
- ▷ **attack [0 - 10s]:** set the attack time.
- ▷ **decay [0 - 10s]:** set the attack time.
- ▷ **sustain [0 - 100%]:** set the sustain level (value corresponds to the track volume).
- ▷ **release [0 - 10s]:** set the attack time.

trigger:

Track to trigger mode was suggested by lines user @mlogger. The request is related to the way *Charles Cohen played the Easel* by clocking it using a looper pedal. The trigger functionality is available over a connected **MIDI device** and/or **crow** (running v3 or later).

The following parameters are available per track:

- ▷ **rec @step [off, 1 – 16]:** If set to other than off **REC** will be toggled (on/off) for the corresponding track at the specified step (1 – 16).
- ▷ **trig @step [off, 1 – 16]:** If set to other than off, an envelope will be triggered, or note-on MIDI message sent over the selected trig output at the specified step (1 - 16).
- ▷ **trig @count [off, 1 – 16]:** If set to other than off an envelope will be triggered or note-on MIDI message sent over the selected trig output **after** a specified number of step counts (1 - 16). Stopping a track resets the counter.
- ▷ **trig output [off, crow 1, crow 2, crow 3, crow 4, midi]:** Select the output destination. If set to **crow 1 - 4** an AD envelope will be sent via the corresponding crow output and the crow parameters for the AD settings will be visible below the trig output parameter. If set to **midi** a MIDI note-on message will be sent via the MIDI device specified under ***global parameters > midi settings*** and the MIDI parameters will be visible below the trig output parameter.

- ▷ **crow parameters:** These parameters define the AD envelope triggered by the corresponding track:
  - **amplitude [0 - 10v]:** Amplitude of the AD envelope in volts.
  - **attack [0 - 1s]:** Attack time of the AD envelope in seconds.
  - **decay [0.01 - 1s]:** Decay time of the AD envelope in seconds.

TRACK PARAMETERS continued:

▷ **midi parameters:**

These parameters define the MIDI note triggered by the corresponding track:

- **midi channel [1 – 16]:** Set MIDI channel.
- **midi note [1 – 127]:** Set MIDI note.
- **midi velocity [1 – 127]:** Set MIDI velocity.

There are many ways the track trigger feature can be used, and experimenting can be highly rewarding. To get started here are a few ideas:

- If you don't have a crow, use your MIDI-to-CV module of choice to send trigs to your modules.
- Use the trigs to fire scripts on your teletype.
- Use multiple tracks to send trigs to the same destination to create interesting rhythms.
- Clock you're sequencer with them.
- Run your mlre output through filters, effects etc. and modulate them with trigs and envelopes.
- Use MIDI to fire samples from your sampler of choice or create interesting drum patterns.

MODULATION PARAMETERS:

The modulation parameter section contains the parameters of the 6 LFOs and most of the parameters are covered under **LFO PAGE**. If more info is required, please refer to the documentation of norns LFO library. LFO destination mapping can only be done via the **LFO PAGE**.

SAVING AND LOADING SESSIONS:

Complete sessions can be **saved** and loaded via norns' pset manager. When a pset is **saved** a folder within ***data/mlre*** is created with the corresponding pset number (e.g., ***data/mlre/01***). Within this folder two files are stored:

- A ***my_psetname.data*** file which contains all track, pattern, manual recall, snapshot and tape data.
- The whole **main** buffer as a ***my_psetname.wav*** file (50.4MB).

When a pset is **loaded** the ***.pset*** file together with the ***.data*** file and buffer are loaded into mlre. While loading all playing **PATTERNS** are stopped. The **REC** and **PLAY** states of tracks are ignored (do not change state).

When a pset is **deleted** the corresponding directory (e.g., ***data/mlre/01***) with the sored files (***my_psetname.data*** and ***my_psetname.wav***) are deleted.