

Tracker

Polyend Tracker

Version: 1.3.0

Instructions of use for Polyend Tracker - Standalone Audio Workstation

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Quick start / Tips & tricks

Basics:

- Play Pattern: press Play.
- Play Song: Song + Play (from the Pattern view).
- Main volume: Master + jog-wheel.
- To edit pattern press Rec (red frame), press it again to disable edit mode (green frame).

Important features and information:

- The Tracker runs on 5V/1A and can be powered from a power bank.
- Firmware update: go to Config > Firmware > chose file from SD card > Confirm.
- Switching pattern view: hold Pattern key + one or two of the Note/Ins/Fx colored keys.
- Off/Fade/Cut step: turn the jog-wheel all the way left.
- Changing (transposing) many parameters at once: select steps > choose the parameter (Note/Instrument/Fx1/Fx2) > use the jog-wheel.
- Overwrite all steps with a single value: select steps > choose the parameter > use grid

pads.

- Copy/Paste/Del works in: Pattern – for all the selected steps; Song – for slots/tracks, Sample Loader – samples/instruments.
- All changes in your project are being autosaved.

From Sample to Instrument:

- Capture audio using Sample Recorder > set source > set gain > record > crop > save & load as an instrument.
- Select audio files > use Sample Loader key to open SD card browser > add samples to project instruments by copying them from the left to the right side. Set their attributes using the Instrument Properties module.
- Turn samples into wavetable/granular synthesizers or chop them in the Sample Playback module,
- Use the Sample Editor module to access instrument overview and apply renderable lossy audio effects.

From Step to Pattern:

- A step is a Note, an Instrument and two Fxs displayed as lines of colored characters,
- Use Pattern module to enter sequencer screen > choose pattern number and its length.
- Input/edit any step parameters > enter Edit mode with a press of the Rec key.
- Input values step by step > using grid pads, jog-wheel and arrows.
- Live-record pattern (Rec + Play).
- To switch between step values use four color keys.
- Use the Fill tool to populate tracks with steps automatically.
- Step function adjusts the interval for the incremental value input.

From Pattern to Song:

- Press Song key > add/del Slots with patterns for arrangement > press Play Song.
- Render song to audio > Go to File > Export > choose what will be rendered.

From Pattern to Performance:

- Use Perform key to tweak tracks, patterns or songs in a “live – on the fly” way.
- Customise and use up to 12 Punch-in effects at the same time: turn on Edit mode > select effects with their values per grid pad row (first is off by default, remaining three are configurable) > using the 1 to 8 screen buttons point the tracks which will be affected > use effect corresponding pad rows with set values to perform.
- Mix selected tracks from different patterns: hold the screen button + up/down arrow

keys > remix tracks from different patterns.

- Shift + 1-8 screen button shortcut mutes each of 1-8 track in the Pattern screen. The same is possible in the Master section with add of track Solo + visual track volume feedback.

Important shortcuts:

- Tempo: Song + jog-wheel.
- Play Song: Shift + Play.
- Record Pattern live: Rec + Play.
- Arm selected tracks for live recording in Pattern mode: Shift + Rec,
- Go to the top step of the pattern: Shift + Insert (Home) in Edit mode (Rec is on).
- Select more than one step on one or more tracks > Shift + arrows (works for clips in Song mode too).
- Select all steps in the track: when on the top of the sequence: Shift + Up arrow (once again to select all steps in all tracks).
- Use Home (Shift + Insert) key shortcut in the Song mode to immediately jump to the top of your composition.
- Copy/Paste entire Pattern: while in edit mode (Rec is on) hold Pattern key (right to the color keys) + press Copy > go to new Pattern > hold Pattern key + Paste (Shift+Copy).

<https://www.youtube.com/embed/GcgdScLbYKQ?feature=oembed>

Introduction



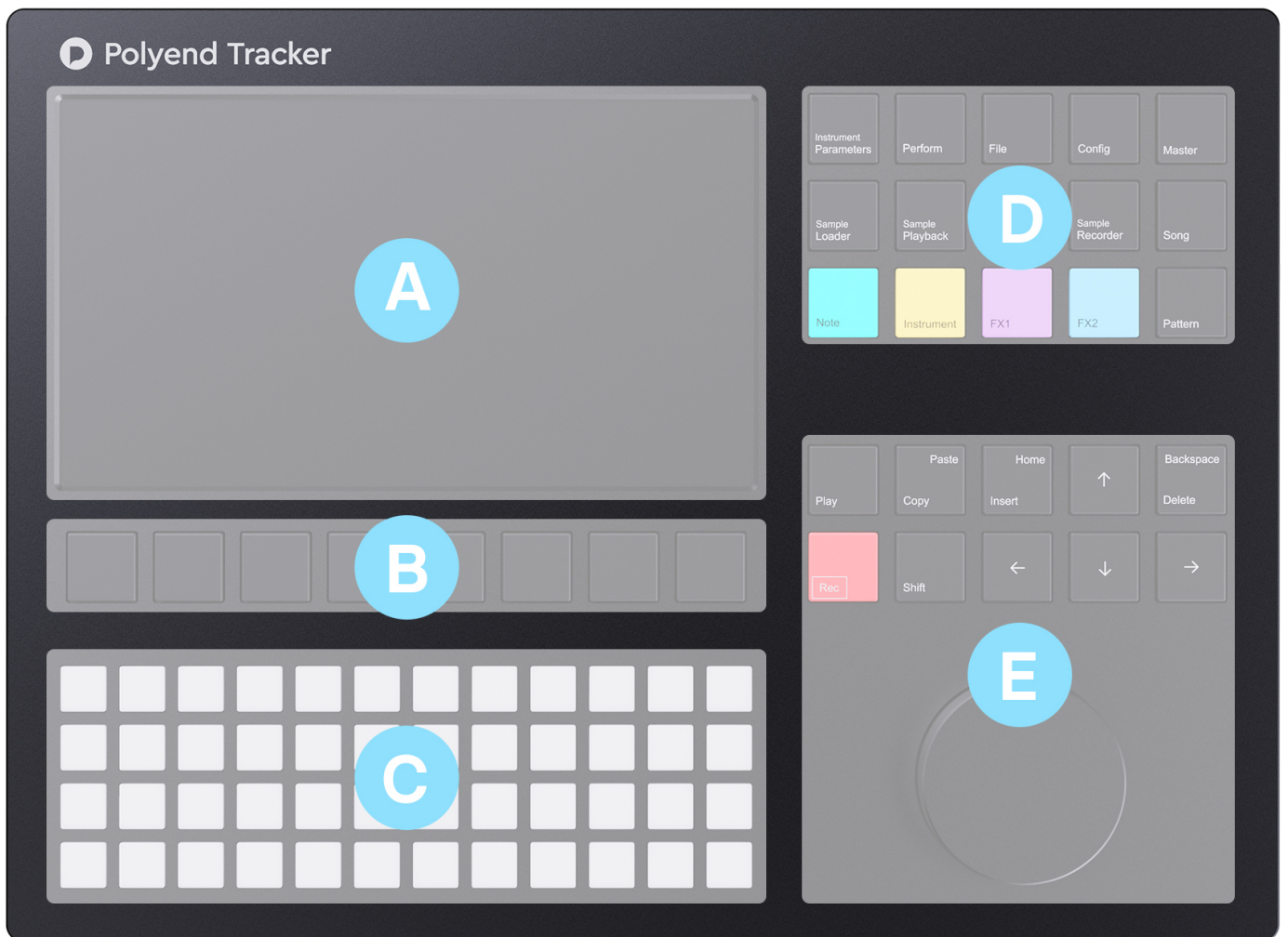
The Polyend Tracker is a unique take on a retro form factor, aimed at artists who break patterns daily. Despite the retro look, it is equipped with powerful modern functionality, Fx, and a handful of forward-thinking creative tricks. The Polyend Tracker is an innovative, inspiring and immediate tool for making music. It functions as a sampler, a synthesizer, and equips you with a powerful and creative sequencer. Tracker has a large screen, ergonomic keyboard, and a big knob for fast and easy navigation. With Bidirectional MIDI control, it plays nice with other gear. It is also standalone and portable – everything you need to produce music anywhere you are.

Tracker features an 8-track sequencer. Each project you create can hold 255 patterns with up to 128 steps each. Every step on each track has dedicated slots for inserting Notes, Instruments, and 2 Effects. Use Song Mode to arrange different patterns together to create a Song, Take advantage of the Perform Mode to mangle, remix, and apply global Fx parameters to different tracks on different patterns. Finally render your sequences to audio files internally, without the use of a computer.

Our new instrument was made to bring back the fun to a process of music composing and sound design. Something we feel we all became very ignorant about with time and all the new technologies around us, and something best about it at the same time. It is certainly a machine that will bring a new fresh breath of enjoyment to your creative process.

Your new adventure starts here, enjoy.

Interface



The Polyend Tracker user interface is divided into five sections:

A – Display – 7" LCD TFT 800 x 480. A centre point of the instrument that displays all the functions and operations in real-time. With brightness level control.

B – **Screen keys** – mechanical controls that correspond to what is displayed on the screen directly above them.

C – The **Grid pads** – 4 x 12 grid of multifunctional (not velocity-sensitive) silicone buttons. It serves as a customizable pitch/tone input keyboard, scalable controller for quick value entering, regular QWERTY keyboard for naming files and for many other functions explained below. Comes with brightness level control. The pads can also visually display the notes/instruments used in the pattern/track sequences (this can be toggled on in the Config menu).

D – The **Function keys** – a dedicated group of quick-access keys that allows fast access to different modules.

E – The **Navigation keys & Jog-wheel** – dedicated controls, transport, arrow keys for navigation, Insert/Home, Copy/Paste, Delete/Backspace and Shift function keys for all the basic and advanced operations.

Back panel



On the back panel, from left to right – find the following ports:

Out – main headphones/line stereo audio output port – use a 3.5mm stereo plug (adapter to 1/4" jack is included in the kit).

- A cable inserted to this port will serve as the onboard FM radio antenna.

Line input port – use a 3.5mm stereo or mono plug. The line input allows both sampling and **live audio monitoring** the external audio sources. The line input is stereo so it plays through in stereo. You can control the volume on Master 3/3 and see the stereo volume bars jumping next to it. It allows sampling of external instruments while they're being sequenced by Tracker.

Microphone input port – use a 3.5mm stereo or mono plug.

MIDI data output port – use the included TRS type-B 3.5mm jack to MIDI DIN adapter to connect to MIDI Input of an external MIDI device.

MIDI data input port – use the included TRS type-B 3.5mm jack to MIDI DIN adapter to connect to MIDI Out of an external MIDI device.

SD card slot – use the included 16 GB micro SD card as data storage.

- The micro SD card must be formatted as a Fat32 partition (find a formatting tool [here](#)).
- The micro SD card needs to be inserted in the port in order to make the Polyend Tracker operational.
- Use the included micro SD card to USB type-A dongle adaptor to access the SD card from a computer.
- The included SD card is 16GB but SD cards with a bigger capacity can be used too.
- Sample folders containing more than 100 files will be automatically split to subfolders.

Reset button – hidden reset button for emergency flashing procedure (explained in the Firmware update section of this manual).

USB Type-C port – 5V 1A power input from any USB power source (included Polyend AC adapter/USB port/power bank).

- Provides bidirectional MIDI class-compliant communication.
- Serves for MTP (Media Transfer Protocol) which allows browsing the files and folders stored on the SD card from a computer level. In order to use it, activate the File Transfer mode in the Config menu. On Windows 10 the card will mount as a new drive. On macOS, you need to use the [Android File Transfer](#) application. Some hubs and adapters may cause connection issues. Use straight connections only or quality adapter kits if necessary.

Power switch – press once shortly to turn the unit on or press and hold for a moment to switch it off.

<https://www.youtube.com/embed/rsCczaVLtC4?feature=oembed>

Audio ports electric specifications

Audio input

Line Input:

- Audio input impedance: 2,9k
- Input level: 8,2 dBu peak,
- SNR: 90 dB

Microphone Input:

- Microphone input impedance: 2,9k
- Input level: 8,2 dBu peak,

Audio Output

Line Output:

- Output impedance: 10k
- Output level: 9 dBu peak,
- SNR: 97 dB

Headphone Output:

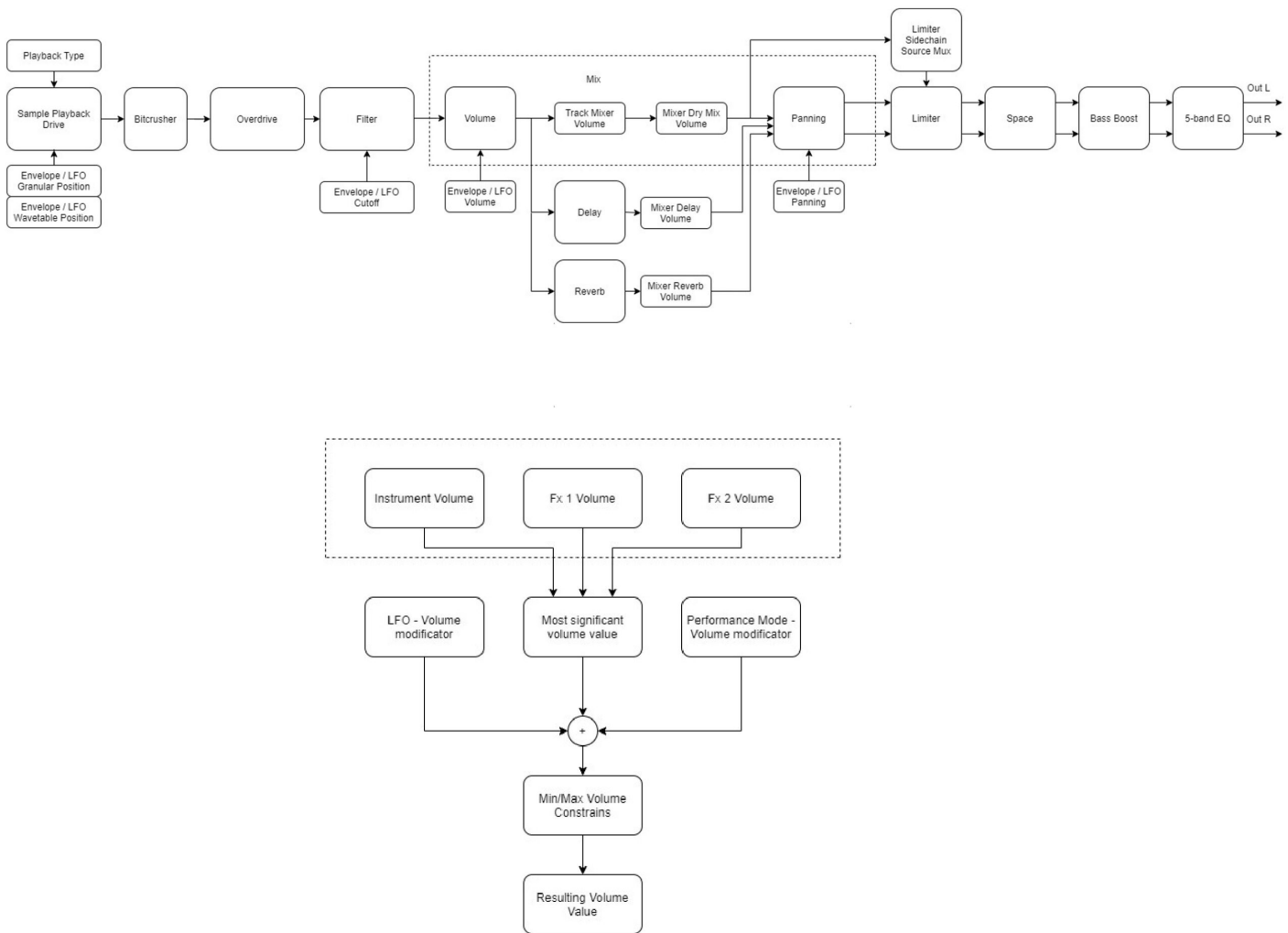
- Output impedance: 16k
- Output level: 17,6 dBm,
- SNR: 98 dB

Audio architecture

The schematics shown below will help you understand the workflow. The first diagram demonstrates the Polyend Tracker's audio signal flow with the list of steps that input sound goes through in order to be heard through the output (the signal flow is the same for each of its eight audio voices).

The implemented reverb algorithm code is created by [Émilie Gillet of Mutable Instruments](#) and is used under MIT license.

The second diagram presents each instrument's amplifying structure.



Dedicated controls

Polyend Tracker's user interface offers different types of controls that can all be used alternatively to navigate and operate the instrument.

Most of the values/data input in the Tracker is done by using the silicone **grid pads**, aluminum **jog-wheel**, the dedicated mechanical **function keys** and the display corresponding **screen keys**.

In most scenarios, these controllers can be used interchangeably – e.g. volume Fx1 value can be precisely entered using the jog-wheel scrolling for the desired value but also entered with a single press of the pad with the exact value.

The multifunctional grid pads can have various applications. They can serve as:

- Customizable tonal keyboard (with scales) for pitched instrument playback.
- Per pad instrument triggering.
- Per pad slice triggering.
- QWERTY keyboard.
- Fast and convenient tool to enter the preprogrammed values (where the first pad is always 0%, and the last one is 100%.)
- Visual feedback > in the Pattern screen, pads can highlight the notes in the active line. Choose between highlighting only the active track's notes, or the entire pattern's active line using the Config menu options,

Important:

- **Shortcuts** – while most of the Polyend Tracker functionalities are rather self-explanatory (just look at the scheme and key names), there are some tricks and shortcuts implemented to speed up the composition process which might not be so obvious at first glance. Most sections are using shortcuts. It's good to master them to compose music in a fast and easy manner.
- Shortcuts apply in similar ways in different sections of the Tracker and are mentioned in these particular sections of the manual, but few are worth mentioning here at the beginning:
 - Master key + jog-wheel > Master volume control,
 - Song key + jog-wheel > Song Tempo control,
 - Insert/Home key > always work as the onscreen Enter key corresponding to the selected screen key,
 - Delete/Backspace key > always works as the onscreen Delete key corresponding to the selected screen key.

<https://www.youtube.com/embed/GcgdScLbYKQ?feature=oembed>

Using the pads as a custom controller

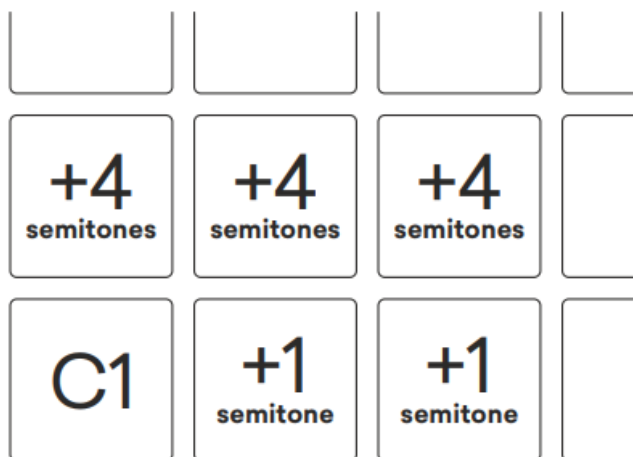
In the **Config**/Project Settings menu you can set grid pads:

- Musical scale filter (see a list in the appendix),
- Layouts,
- Root note,

The 4 x 12 grid of low profile silicon pads allow you to easily strum fingers across pads. They work great for playing both internal and external instruments live. With or without one of the 39 included **musical scales** filters applied. Not only the scale filter can be set but the **pads layout** too (the relationship of notes on the pads) and the **root note** too.

The playable matrix of pads is laid out with the lowest note value being in the lower left pad (pad 37), incrementing a semitone with each position to the right. If pad 37 were a C1, then the next note on pad 38 would be a C#1, pad 39 would be a D1, and so on until pad 48 which would be a B1.

How the adjacent pads change pitch depends on the chosen Layout from the Config menu. Choose a pad, and the pad directly to the right will increase the pitch one semitone regardless of the chosen Layout. For Layout 1, the pad directly above will increase the pitch 1 semitone. For Layout 2, the pad directly above will increase the pitch 2 semitones. For Layout 4, (see the illustration) the pad directly above will increase the pitch 4 semitones.



Keyboard layout 4

Loading & saving projects



Use the **File** key to access all the operations performed on project files.

New project > create a new project.

Open > use arrow keys to select the desired project name. Use the Open screen button or Enter function key to load it. Use the Delete screen button on the selected projects to remove them from the micro SD card.

Import mod files.

Save > save a project.

Save as > save another instance of a project,

Export > export song, song stems, chosen pattern, chosen pattern stems, export to .it file.

Games > starting from the v1.3.0 firmware, the Tracker is able to run the onboard games (located in the SD card root directory Games folder). Start them here. Press reset button to exit the game.

Important:

- The work you do on a project is constantly **autosaved**. When a project is named and ready, or even while working on a default “blank” project – everything that is being done is being automatically saved. There is no need to remember to save all the time. It is normally possible to recover current work even when Tracker was accidentally

switched off.

- When copying project folders to the SD card, their folders need to be placed directly in the Projects folder. Project subfolders won't be displayed by the browser.
- Use the dongle USB SD card reader or use the MTP (Media Transfer Protocol) to copy existing samples to the SD card.

Importing & exporting projects

Polyend Tracker is able to import/export classic tracker project files with their basic properties (samples/instruments, notes/patterns, song structure and volume info).

Open .mod/.it (many other classic tracker project file formats like .xm/.s3m can be opened in the Schism Tracker or Milky Tracker and then converted and saved as .it and so imported to Polyend Tracker).

Export .it files that are compatible with the Renoise, Schism Tracker or Milky Tracker.

Important:

- Files which you want to import to the Polyend Tracker needs to be placed in the MOD folder on the SD card so they can be accessed. Subfolders won't be displayed by the browser.
- When exporting your project to .it file the used LFOs settings are transformed into envelopes.

Note: The .mod file import is still under the development and its functionality will be improved.

Sampler

The Polyend Tracker is primarily a sampler with a built-in sequencer. Single-shot and short loop monophonic audio files are what it works with best. The overall per **project memory is 133 seconds of mono samples** (or twice more when using the low-quality sample Import function). Main/headphones output is in stereo (set the internal L/R channel panning for spatial effect).

Classic tracker workflow relied on the use of one-shot and short loop type samples. With

their limited sampling time memory was not really meant to work as sample loopers. Polyend Tracker is not different, this is a conscious choice – its limitations are meant to force your creativity and let you stay focused. Working inside such limitations is one of the things that made the classic trackers so unique.

Recording audio

https://www.youtube.com/embed/cKr9QLcTI_c?feature=oembed

Press the **Sample Recorder** key to open the audio recording section. Choose the sampling source: line input, FM radio or microphone input. Set the recording gain and toggle the monitoring on. Use the onscreen Record key to start recording, press stop when ready.

When a sample is recorded, it can be trimmed on both start and/end points and cropped. Save it to the SD card memory or directly to the project as one of the instruments using the Save & Load function. Set/change the name of any audio file manually using the grid pads as a QWERTY keyboard or using the **auto-naming** function.

A **metronome** can be activated in the Sample Recorder view too. Toggle it on in the Config > turn off the record monitoring function > press Record screen button.

It's possible to **play pads** or **use sequencer over the MIDI output** in the Sample Recorder section in order to capture the audio of external MIDI instruments. The line input allows both sampling and live monitoring the external audio sources. The line input is stereo so it plays through in stereo. You can control the volume on Master 3/3 and see the stereo volume bars jumping next to it. It allows sampling of external instruments while they're being sequenced by Tracker.

Tweak the recorded samples using the **Sample Playback** and **Sample Editor** sections.

Important:

- Polyend Tracker browser recognizes uncompressed PCM WAV files only. It won't display AIF or any other audio file types.
- The Tracker sampling rate and **supported audio files are 44.1kHz** with 16, 24 and float 32-bit resolution only.
- All other WAV files with different properties are being **automatically converted** to supported 44.1kHz 16bit mono PCM files.
- Stereo files are converted to mono automatically.
- The onboard FM radio is equipped with automatic fine-tuning.

- The longest internally recorded audio file can be about 45 seconds long.
- Any cable connected to the Output jack port becomes the FM radio antenna. A straight cable works best.
- Samples in the Polyend Tracker are automatically interpolated by the implemented **anti-aliasing** function (can be toggled on/off in the Config menu).
- Tracker's audio engine is using an implemented **de-clicking** algorithm.
- Notice that the volume of samples recorded from any external source or FM radio is always on the exact same level as the original source (plus Gain). But their playback volume depends on factors as the volume set in Instrument Parameters and the track volume from Master section mixer.

Sample playback

<https://www.youtube.com/embed/yj4iYy95gIk?feature=oembed>

Sample Playback key gives access to all the classic sample-based playback options plus a Slicer and Beat Slicer. There are also sample-based Granular and Wavetable synthesis instruments. Available options are:

- 1-shot (preview, set start point, set endpoint, zoom),
- Forward/Backward/Pingpong Loop (preview, set start point, set loop start, set loop end, set endpoint, zoom).
- Slice – use to slice a sample by manually adding and adjusting slice points, or use the auto slicing function which automatically detects dynamic amplitude changes and slices audio file accordingly (separate slices portions can be adjusted later on). The number of the slice can be accessed via per step Slice Fx (S).
- Beat Slicer – use to play and record the sample slices per step. In this play mode notes represent slice numbers (starting from C1 > slice 1).
- Wavetable – using this play mode you can make a Wavetable synthesizer by using any sample (or specially prepared interpolated wavetable audio files).
- Granular – this is a particular approach to granular synthesis where each voice has one grain, it is simple yet very musical. Just set the grain position, length and shape and adjust the direction of the playback loop (Forward, Backward, Pingpong). Apply position modulations using available LFO or envelopes.

Important:

- In the Slice play modes press the Shift button to apply equal slices and their desired number.

- To get classic wavetable results, use specially prepared wave files that give smooth transition when changing its position (wavetables that have 256 frames). There are several wavetable sample standards that can be adjusted using the Window parameter indicating the length of the frame and use any kind. Note: it's possible to use other wavetable samples that are available for software synthesizers (e.g. Xfer Records Serum and Arturia Pigments uses 2048 window, Ableton Live uses 1024 window). To automatically transform the shape of Wavetable use available automation (LFO or Envelope).
- Use the **WT Smoother** tool in the Sample Editor section in order to turn any sample into a smoothly interpolated wavetable synthesis sound source.

https://www.youtube.com/embed/-7kk6_P1cE4?feature=oembed

<https://www.youtube.com/embed/JuNJMHgBXkE?feature=oembed>

<https://www.youtube.com/embed/a1-EBYzuEHQ?feature=oembed>

<https://www.youtube.com/embed/DsCgf3tOpSo?feature=oembed>

Sample editor

https://www.youtube.com/embed/qALA_ka_qGQ?feature=oembed

Use **Sample Editor** key to access a section that provides an overview of the selected instrument sample. Set the sample start and endpoints using a precise zoom tool. Use the preview function to hear changes. Crop their desired parts and cut out what's not needed to free up the sample batch memory. Keeping it tidy is a good habit considering the limited memory

The effects can be applied to the entire sample/instrument or to their parts selected by the start and endpoint markers only.

Apply one of the available audio effects and render them directly into the edited sample:

- Normalizer – adjusts the gain by a constant amount of gain to an in order to bring the amplitude to a target level (the norm),
- Crop,
- Reverse,
- Amplifier – applicate a selected amount of gain to an audio recording,
- Overdrive – adds distortion using gain and type values,
- Delay – with ping-pong, sync, feedback and time parameters,
- Bitcrusher – with adjustable bit rate,
- Chorus – with settings of length and voices,

- Flanger – with length, offset, depth and rate parameters available,
- Equalizer – with access to Low & Mid dB and Frequency settings and High at 12kHz settings,
- Limiter – with adjustable threshold, attack and release parameters,
- Compressor – with threshold, ratio, attack and release options,
- WT Smoother – turn any sample to an interpolated wavetable by setting its window number (from 1 to 256) and length (from 1 to 2048),
- Timestretch Beat – with Tempo, Steps Micro-step and Granule settings,
- Timestretch Note – with Length and Granule parameters available,
- Fade In,
- Fade Out.

Note: Sample Editing is destructive for the sample and changes the sample itself in your project. All modifications can be undone at any time until the file is saved. The original sample will remain intact on the SD card.

<https://www.youtube.com/embed/JnS6v63Xdfw?feature=oembed>

<https://www.youtube.com/embed/jGQoIEmL3yl?feature=oembed>

Sample Loader - preparing instruments

The screenshot shows the 'Sample Loader' interface with a dark theme. At the top, it displays '4m : 37s' and '07P 06S'. The interface is divided into two main columns: 'SD Card' and 'Instruments'. The 'SD Card' column lists various audio files, with 'PianoRtm.wav' highlighted in red. The 'Instruments' column lists 16 instrument slots, with slot 7 highlighted in white. At the bottom, there is a control bar with buttons for 'Add', 'Add next', 'Preview', 'Rename', 'Import', and 'Delete unused', along with a 'Project memory 15%' indicator.

SD Card	Instruments
/Oneshots	4. StereoHat_03_SP.wav
/Wavetables	5. StereoHat_04_SP.wav
Generative4Voice-C.wav	6. RideBell_01_SP.wav
Generative4Voice-a.wav	7.
Generative4Voice-b.wav	8. ElectricSnare_03_SP.wav
MD_percLoop.wav	9. LiveSnare_01_SP.wav
MDrum_loop.wav	10. MonoClap_04_SP.wav
MDrum_loop_full.wav	11. ForestClap_01_SP.wav
PianoChords.wav	12. WaterDroplet_01_SP.wav
PianoRtm.wav	13. HiSynthTom_01_SP.wav
Piano_rising.wav	14. LiveTom_01_SP.wav
Puredata_130ish.wav	15. F_AnalogFilterSynth_01_SP.wav
Puredata_Sliceme.wav	16. G#_AnalogBassTone_01_SP.wav

The **Sample Loader** key opens the SD card browser. Preview samples here and use them to

prepare instruments which will be later used to create patterns and songs.

Create instruments by loading the samples to the project sample pool from the SD card. Copy a sample from the browser on the left side of the screen to its right side by using the **Add** or **Add next** (where the browser cursor will jump one position down after adding the sample) screen buttons.

Samples copied to the internal memory becomes Instruments with their own number, name and separate settings. Instruments can be renamed with the use of a **Rename** screen button or removed with the use of the **Delete** key.

Use **Import** function to load pieces of long samples which are too long to be loaded to the sampling pool as a whole or to use the **Low-quality Import** to save memory space.

The **Delete unused** function will purge your sample pool out of the Instruments which were not used in the project.

Tweak instruments using the Instrument Parameters and Sample Playback. Use the audio files in the classic sampler or sample slicer (explained in the sections below), or use them as a source for the wavetable and granular sample-based synthesis engines.

Important:

- A maximum number of 48 instruments is available.
- To duplicate instrument use Copy/Paste in Sample Loader module.
- Press and hold the yellow Instrument key to pop up an instrument browser window from the Pattern screen level.
- Press and hold the Preview screen button in order to preview long samples.
- Hold down the Preview screen button while using Arrow keys or Jog-wheel to preview samples fast,
- Replace an existing instrument by loading another sample to its position (all other properties of the instrument remains the same).
- The progress bar is showing the sample pool capacity in percents (displayed in white). Red color displays the space needed to load a certain sample as an instrument. The green color is showing when a replaced sample will free up some of the sample pool time.
- Use the originally attached in the kit dongle USB SD card reader or use the MTP (Media Transfer Protocol) to copy existing samples to/from the SD card.
- Shortcuts:
 - Left arrow in the left browser > takes to the very top of the browsed folder,
 - Use Shift + arrows > for batch selection (more than one file at a time),

- Use Copy/Paste > for duplicating the Instrument,
- Use the Insert/Home key as an Enter.

<https://www.youtube.com/embed/wlkXSamoQuE?feature=oembed>

<https://www.youtube.com/embed/XSkrjryXYE0?feature=oembed>

Instrument parameters and automation

<https://www.youtube.com/embed/HdwiucFxDZs?feature=oembed>

The **Instrument Parameters** key gives access to two screens (marked in the upper left corner of the screen **1/2** and **2/2**).

Screen **1/2** – Instrument Parameters where both sample-based and MIDI instrument properties are available:

- Volume (in dB + Gain),
- Panning (from -50L to 50R),
- Tune (from -24 to 24),
- Fine-tune (from -100 to 100),
- Filter type (disabled, low-pass, high-pass, band-pass),
- Filter cutoff (from 0 to 100%),
- Filter resonance (from 0 to 100%),
 - Instrument Effects – Overdrive (from 0 to 100), Bit depth (from 16bit to 4bit),
 - Reverb send & Delay send (from -inf to 0 dB),

When a MIDI instrument is selected from the pop-up list in this screen, a list of CC properties for the a – f step effects will appear.

Screen **2/2** – Instrument Automation:

- Destination – the automation can be targeted to the following destinations:
 - Volume,
 - Panning,
 - Filter Cutoff,
 - Wavetable Position,
 - Granular Position,
 - Finetune,
- Automation type:
 - Off,

- **Envelope** with Attack, Decay, Sustain, Release and Amount settings,
- **LFO** with Shape (Rev Saw, Saw, Triangle, Square, Random), Speed (from 24 to 1/64 steps for Volume value and from 128 to 1/64 steps for all the other destinations) and Amount settings.

Important:

- The LFO speed is always hard synced with the project tempo.
- The number indicating the speed of LFO is corresponding to steps. For example Speed = 16 means that one LFO cycle will last for 16 steps.
- To change/choose an instrument from Instrument Parameters screen quickly – press and hold the yellow Instrument key and a pop-up list of instruments will appear.

From step to pattern

Use the **Pattern mode** in order to create musical sequences by simply placing steps consisting of Note/Instruments/Fx1/Fx2 + their values as events appearing in time.

This is the Tracker's main screen, the one you will be spending most time working with and probably the most important one – the step sequencer view with the classic tracker vertical layout. Create project patterns here. Store up to 255 of them per project. Each pattern consists of 8 audio/MIDI tracks which can be from 1 to 128 steps long.

Hold down the Pattern screen button to see the occupied/stored patterns/pads.

Each track is both audio and MIDI at the same time. Step properties determine if the internal sample-based instrument or external MIDI instrument will get triggered (explained in the section below).

Pattern view **playback** modes:

- Press Play > play the pattern from the 1st step,
- Press Shift + Play > play pattern from the currently highlighted step,
- Press Song + Play > play the song arrangement.

Patterns can be changed in different manners:

- By using the Pattern function key and:
 - Left/right arrows for a **sequential** change – patterns change after the currently playing pattern phrase reaches its end (pattern number will blink red),

- Up/down arrows and/or Jog wheel for an **immediate** pattern change.
- By using the **Pattern screen** button and:
 - Left/right arrows for a **sequential** change – patterns change after the currently playing pattern phrase reaches its end (pattern number will blink red),
 - Grid pads for an **immediate** pattern change,
 - Up/down arrows and/or Jog wheel for an immediate pattern change.

37	bazz	02	S	3	---	kicksnr	---	cymb-hh	---	synth	---	37			
38	---	---	---	---	---	---	---	C5	09	---	---	38			
39	---	---	---	---	---	---	---	C5	10	---	---	39			
40	---	---	---	---	---	---	---	---	---	---	---	40			
41	C5	03	S	1	L 70	OFF	---	C5	10	---	G6	M02	V 25	---	41
42	---	---	---	---	L 65	---	---	---	---	---	F6	M02	V 50	a 15	42
43	C5	03	S	1	L 60	---	---	---	---	---	D#6	M02	V 75	a 45	43
44	---	---	---	---	L 55	---	---	---	---	---	D6	M02	---	a 80	44
45	C5	03	S	1	L 50	C5	02	S	6	RV 2	G#5	M02	---	0 37	45
46	---	---	---	---	L 45	---	---	---	---	---	---	---	---	---	46
47	C5	03	S	1	L 40	---	---	---	---	---	---	---	---	---	47
48	---	---	---	---	L 35	---	---	---	---	---	---	---	---	---	48
49	C5	03	S	1	L 30	---	---	---	---	---	---	---	---	---	49
50	---	---	---	---	L 25	---	---	---	---	---	---	---	---	---	50
51	C5	03	S	1	L 20	---	---	F6	05	---	---	---	---	51	
Pattern		Length		Step		Fill		Preview		Undo		Redo		More	
10		64		1											

Pattern – screen buttons:

- Pattern – choose the currently edited pattern from 1 to 255,
- Length – set the length of the current pattern (each pattern can have different lengths),
- Step – set the interval for entering the steps by incremental one by one step data input,
- Fill – a tool that allows entering multiple steps with different values with just one click,
- Preview – previews the selected step or steps within the selection,
- Render selection – renders selection to a new audio sample,
- Undo – reverts the last made changes,
- Redo – reverses the undo or advances the buffer to a more recent state,
- More – gives access to a set of another 8 functions,
- Invert – vertically inverts all the sequence steps within the selection,
- Duplicate pattern – doubles the length of the pattern and automatically duplicating all the existing steps,
- Expand pattern – doubles the length of the pattern by adding empty steps in between

existing ones,

- Shrink pattern – divides pattern length by two by deleting each second step,
- Copy pattern is copying the entire current pattern,
- Paste pattern is pasting the entire current pattern,
- More – gives access to a set of previous 8 functions,

All the above functions are explained in details in the sections below.

What is a step?

A **step** is a **Note**, an **Instrument** number and two **Fx**. These four values are displayed as a line of colored characters that correspond to the colored Function keys located on the right side next to the display. Use them to toggle between step properties.

Each step can be set to trigger the internal audio sample-based instrument or an external MIDI instrument.

To set a selected step instrument to MIDI > navigate jog-wheel in the left direction > after the project instrument 01 it will access MIDI instruments from M01 to M16 (which represents the MIDI channels).

Jog wheel scrolling in the right direction will access the project sample-based instruments from 1 to 48.

The MIDI instrument numbers will be displayed with a different type of font than the one used for internal instrument numbers. All the settings of MIDI instruments are available in the Instrument Parameters section (just select one of the MIDI instruments).



What are these numbers all about? Let's take a look at the example:

- C5 (turquoise) > Note and octave or note-off (OFF/CUT/FAD),
- 14 (yellow) > Instrument number,
- H 30 (purple) > Fx1 – a letter or a symbol indicating the type of used effect and the number right representing its value,

- P -2 (blue) > Fx2 – the same as in Fx1.

Note: Fx in the Polyend Tracker are not necessarily audio effects as one will find in other types of electronic music instruments. They often serve more as automation/modulation information. Each Fx has a different letter and separate effective value associated. They offer 25 automation options and an additional 6 MIDI CC/PC and 1 MIDI chord Fx's.

An onscreen Fx **description popup** is available while in the Pattern sequencer view. Press and hold one of the colored Fx keys to show the Fx list and use the corresponding screen button underneath in order to expand their description with the available parameters and their ranges (see the full list in the Appendix).

Important:

- Step/note length is a distance between a note and next note or "note off" (shown as OFF in the pattern).
- To enter a note-off value (OFF) turn the jog-wheel all the way to the left,
- When note hits the note-off (OFF) Envelope Release is being run,
- Use CUT (cuts the sound immediately) and FAD (gently fades the sound out).
- CUT and FAD also turn off MIDI notes.
- Change the currently edited step properties (Note/Instrument/Fx) by using the four colour corresponding Function keys to toggle between their values.
- Entering a Note always inserts the number of an Instrument and vice versa – entering the desired Instrument inputs a default Note value. When these step properties are already present on the desired step, add one or two Fx s with their own values too.
- Unlike most of the classic trackers, Polyend Tracker is offering hexadecimal values display only for the sequence step enumeration. To simplify the understanding of the workflow it is using a decimal system for values/data entering only.
- Hold down the Pattern screen button to see the occupied/stored patterns/pads.

https://www.youtube.com/embed/3c_vlZJZef4?feature=oembed

https://www.youtube.com/embed/rST8s9U_M5E?feature=oembed

<https://www.youtube.com/embed/1qZU6g4WxPY?feature=oembed>

<https://www.youtube.com/embed/mQorZHE73Sc?feature=oembed>

Pattern views

The default **pattern view** displays 4 of its 8 tracks. But it is possible to display and work on 8 tracks at the same time too. While all the four positions of a step: Note/Instrument/Fx1/Fx2

are visible – only four tracks fit on the screen. Narrow the columns of the steps using the following shortcuts:

- Pattern function key + Note key,
- Pattern function key + Instrument key,
- Pattern function key + Fx1 key,
- Pattern function key + Fx2 key,

Combine displayed step information/properties by pressing Pattern key + Note + Instrument key > 8 rows of Note and Instrument couples for each track are being displayed (works in any combination). Press Pattern key itself again to bring back the default step view.

<https://www.youtube.com/embed/rzdjh-UJCNU?feature=oembed>

Pattern editing

Start a new project > load samples > go to Pattern > turn on Edit mode (press Rec) > use the arrow keys to navigate > input steps manually with the grid pads or the jog-wheel or using the tools explained below.

The current pattern position is marked with a **green frame** (use the jog-wheel and/or arrow keys to overview track sequences). In order to make any changes in the patterns, to input/change the step values, copy steps or patterns etc. – the Edit mode needs to be activated with a press of the red function Rec key. A **red frame** will appear around the currently selected step/steps marking the currently edited positions (use the arrow keys for navigation and jog-wheel to input/change desired step properties).

Most of the step edit actions performed in the Pattern section can be done both on a single or multiple selections of steps. One of the classic tracker strengths was the ability of quick values/data input and edition. Knowledge and fluent use of the shortcuts mentioned below will be crucial to achieving the coveted effect on this field.

Backspace/Delete – to remove the selected step/steps or their Fx values. To delete the entire step > delete the Note or the Instrument number. Delete the step Fx values separately. Deleting an Fx value itself won't erase the entire step, just the selected Fx.

Copy/Paste (Shift + Copy) – to move existing steps/selections/tracks/patterns around quickly. It is possible Copy/Paste the selected Fx value only.

Insert/Home – press to add an empty step and move down all the steps already existing on

the track/tracks.

Use Backspace (Shift + Delete) to move all steps on the track in the up direction.

Shortcuts:

- Shift + Insert (Home) > jumps to the first step of a track sequence.
- Shift + Up arrow (when on the first step of a sequence) > selects all the steps in the track
- Shift + Up arrow + Up arrow (when on the first step of a sequence) > select all the steps in all the 8 track sequences.
- Shift + arrows > marks more the one step on one or more tracks.
- Pattern key + Up/Down arrow > switches the current pattern.
- Copy/Paste entire Pattern > hold Pattern key + Copy key > go to new Pattern and hold Pattern key + Shift + Copy (Paste) to paste.
- Input OFF/Fade/Cut step > turn the jog-wheel all the way left,

Important:

- Set pattern/project **Tempo** in **BPM** (from 40 to 800BPM) in the Song section.
- To transpose/change multiple values, make a selection of steps > turn the jog-wheel.
- To step input a **chord** > select as many adjacent tracks as many notes you want in your chord using Shift + arrow keys while in the edit mode and use pads or external controller to input multiple notes at the same time.
- The pattern length and timing scale are always the same for all the 8 tracks, same as in classic trackers.
- Use Length and Step + left/right buttons to change their values with predefined intervals (2,4,8,16).
- Insert spaces on multiple columns simultaneously by using Shift+ Arrow keys across columns before pressing the Insert key.
- When browsing for instruments > navigating jog wheel in left direction will access to MIDI instruments from M01 to M16, while jog wheel scrolling in the right direction will access the internal instruments from 1 to 48. The MIDI instrument numbers will be displayed with a different type of font than the one used for internal instrument numbers.
- When using the pads for playback of both and the internal sample-based and MIDI instruments – there are differences between the green and red (edit) modes. The green mode is playing back the note and instrument only and is more of a controller type. The red (edit) mode will playback the entire step with its fx and it's relation to the projects BPM.

- External source MIDI clock and transport in the Pattern mode will playback the current pattern on a loop, while in Song mode will play the entire song.
- Particular tracks can be **renamed** in the Master section.
- **Transpose** octaves by using the Jog-wheel + Shift while editing step's Note.

Step & Fill tools

Besides the basic step input options, the Polyend Tracker offers two compelling step input/editing tools. **Step** and **Fill** tools are crucial to master to get a quick musical output without spending too much time. Used skillfully, they can radically speed up both the composition process and productivity.

Step function allows setting the interval for that incremental step input range. When steps are being manually entered on a track – the timeline row will move down to another step position. Use Step with setting from 0 to 32 to set the interval. Now, each step will be entered exactly in the needed spots without a need of scrolling or navigating to them.

Fill tool is a sophisticated sequence editing utility that allows entering multiple-step values to a selected edited area with a single click. Depending on the mode (Fill Notes/Fill Instruments/Fill Fx), there is a wide variety of application of the Fill tool with the following settings to choose from:

- Where? – Indicates where to insert a Note/Instrument/Fx:
 - Note – applies (replaces) new notes to all of the steps with already existing notes within the selection,
 - No Note – fills all steps that contain no notes within the selection,
 - Fx – finds and fills all steps with Fx within the selection,
 - No Fx – finds and fills all steps where there is now Fx assigned within the selection,
 - Random – with selectable density in %, randomly fill steps within the selection,
 - Euclidean – set a number of events from 1 to 32 to generate a rhythmic pattern. How evenly spaced the resulting pattern is will depend on how neatly the step length divides by the number of events. For example, an eight-step sequence with four events will result in an evenly-spaced pattern of one-hit every other step, whereas an eight-step sequence with five events will result in a less even pattern with hits falling on steps 1, 2, 4, 5 and 7.
 - Each 1-32 – evenly fills steps with the chosen interval within the selection,
- Scale (only in Fill Note) – applies a chosen musical scale filter for the Note input,

- Fx Type (only in Fill Fx) – pick one (or many random) Fx types to be filled into the sequence steps. Please note that the Random Fx Type does not use the Tempo Fx for filling,
- Fill type:
 - Constant – fills the same chosen value for the selected steps,
 - From-To – fills in the selected area, evenly distributing the values within the chosen range,
 - Random – randomly chooses the values within the selected range.

A short example on how to efficiently use the Fill tool in a few steps would be to make a random melody:

- Highlight all steps in a track (or tracks) > Shift + Home (Insert) then Shift + Up arrow in Edit mode on (Rec).
- Press the Fill screen button.
- Determine what needs to get filled in, eg:
 - choose Note,
 - choose Chromatic scale,
 - choose Random fill type, set the density,
 - indicate its root note,
- Confirm with a press of the Fill screen button.

This way, a random melody in a Chromatic scale is created. Use the same trick to populate steps for the selected area on one or more tracks for the Notes/Instruments/Fx at the same time with one press of a button.

<https://www.youtube.com/embed/w5WJO9mAVtM?feature=oembed>

<https://www.youtube.com/embed/OrePpoHd8aU?feature=oembed>

<https://www.youtube.com/embed/aA-iB78ZtbQ?feature=oembed>

Other Pattern tools

The preview function allows listening to a selected step (with all its properties) or entire edited selection on one or more tracks.

Undo/Redo functions are really useful when making multiple changes at a time and hit the wrong button by mistake (every change made in the Pattern editor is being automatically saved). To use these functions, simply press the Undo or Redo Screen buttons. It works up to 20 steps both ways.

More is giving access to a set of another 8 functions.

Render Selection (to sample) is a very useful and creative function that allows rendering a selected step or step selection (on one or more tracks at the same time) into a single audio file. In Pattern section > turn Edit Mode on (Rec) > use Shift + arrow keys to select the desired area > now use the Render screen button to create a new sample clip. The delay and reverb send fx's are being rendered too if used on the selected steps/instruments, this includes their "tails" too.

Invert operation vertically inverts all the sequence steps within the edited selection. This allows adding more variations to patterns in a simple manner.

Duplicate pattern doubles the length of the pattern and automatically duplicating all the existing steps.

Expand pattern doubles the length of the pattern by adding empty steps in between existing ones.

Shrink pattern divides pattern length by two by deleting each second step.

Copy pattern is copying the entire current pattern.

Paste pattern is pasting the entire current pattern.

More is giving access to a set of previous 8 functions.

<https://www.youtube.com/embed/VyKyLy6gPjE?feature=oembed>

<https://www.youtube.com/embed/ft7sAgHzmt8?feature=oembed>

<https://www.youtube.com/embed/Z2bwHuECbww?feature=oembed>

Real-time pattern recording

To start **live-recording** the pattern, hold Rec and press Play key and start adding notes or values in a "live" manner using the grid pads as be playing a regular keyboard. After sequences of events are recorded – edit them as mentioned in the previous section if

needed. A metronome with a pre-roll function is also available in the Config menu to make the live-recording easier.

Arm tracks selected for live recording in Pattern mode by pressing: Shift + Rec.

There are three different modes of live recording in the sequencer. To switch between these modes use the colored Note/Instrument/Fx buttons. The recording is available in the following modes:

- Notes – where the “note off” action will be also recorded. Useful to record chords and melodies.
- Instruments – where the “note off” action is not recorded. Appropriate to record drum beats.
- Fx – where the “note off” is not recorded either.

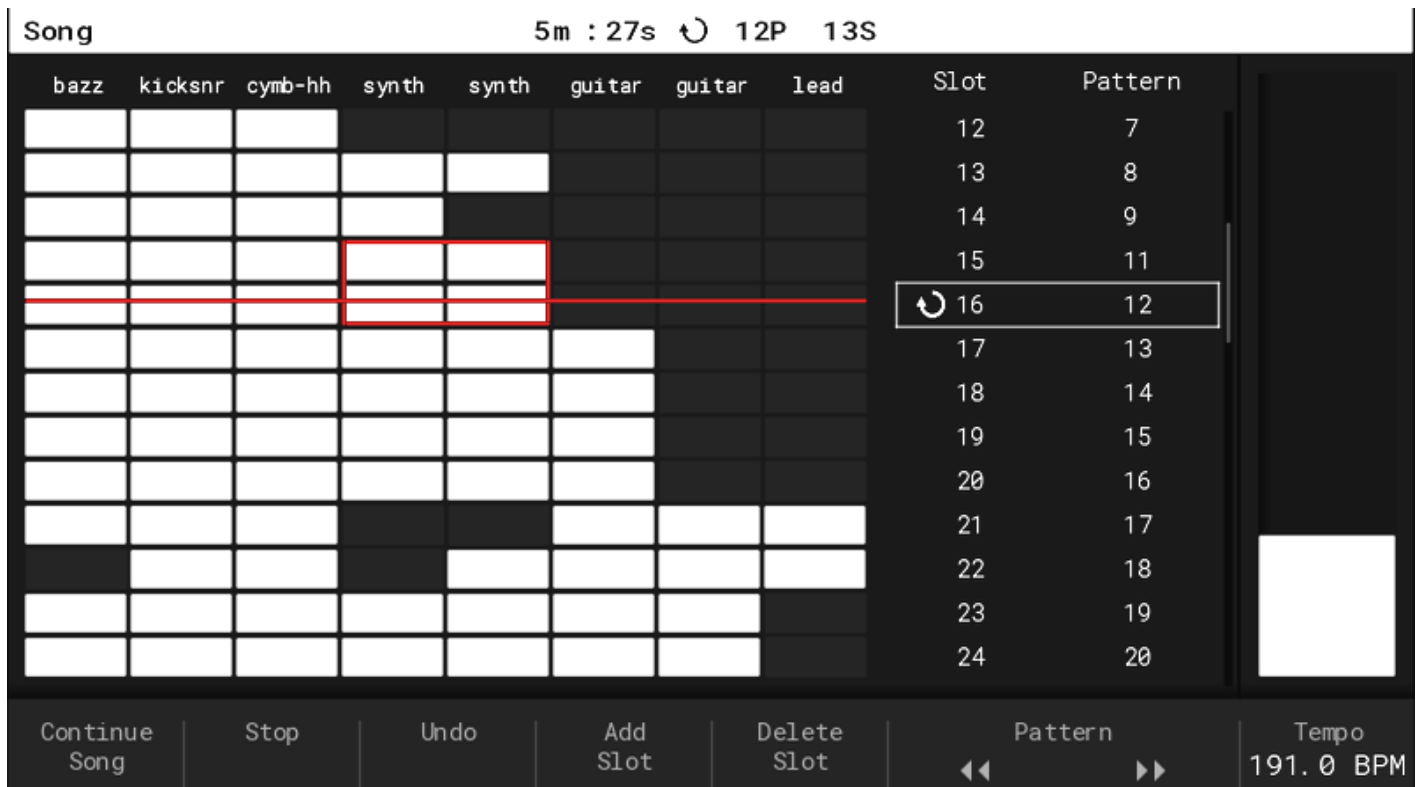
Important:

- Choose what parameter (Note/Instrument/Fx) is being recorded using the colored keys.
- When recording notes from the grid pads, micro-timing is also being recorded as one of the Fx. To quantize the recording, simply delete all the “m” Fx.
- Polyend Tracker offers 8 monophonic audio/MIDI tracks. That means if a triad chord is played while live recording – it consumes three of its eight tracks. There’s a MIDI chord step Fx available to help you overcome this limitation.
- Unless you’ve Armed selected tracks for live recording, it starts with the track that is currently being edited.
- When live recording to an occupied track step with already existing notes/values, Tracker will record changes on the track to the next one to the right. It won’t overdub the steps with existing notes/values.
- Exit and enter the Live recording mode again without stopping the sequencer by pressing the red Rec button.
- The grid pads are not velocity-sensitive and the “live record” mode will record notes with micro-moves Fx but won’t record the velocity Fx. Use an external velocity supporting keyboard to record both unquantized notes and velocity.
- Change patterns by pressing Pattern screen button + grid pads/arrow keys/jog-wheel.
- Find the **metronome** with its options in the Config section.
- Find global quantization option (Record micromoves on/off) in the Config menu.

<https://www.youtube.com/embed/7IzKWAoanqs?feature=oembed>

Song mode

Making a pattern or a few of them is usually quick and fun. But how to turn them into a fully composed and arranged piece? The **Song mode** would be the answer. A song is an arrangement of patterns in the desired order of playback.



In the Song mode, the timeline also runs vertically moving down line-by-line from the top of a pattern/phrase to the bottom, triggering the pattern sequences containing Notes/Instruments/Fx stored in each line.

Song mode is offering a **Green mode** where the screen scrolls with the timeline and where it's possible to switch between the **Play Pattern** and **Play Song** without stopping the sequence. And a **Red mode** for the Song structure edition (press Rec key).

Song mode offers a simple way of sequencing previously prepared patterns by setting their number per **Slot**. Use the screen buttons – Add Slot, Delete slot, arrow keys and the jog-wheel to prepare the sequences of patterns to create songs. Copy/paste/delete any of the pattern tracks represented as clips. A song can have up to 255 Slots.

A Slot always consists of eight cells/clips which represent eight tracks of previously prepared patterns. Filled cell/clip means there is a sequence on this particular track. Empty cell/clip means that this particular track does not contain any sequences with steps.

Add/delete song rows/slots and copy/paste the pattern tracks using the onscreen commands + screen keys. Use these functions to move the selected pattern's track 1 to track 2, etc. With these simple yet versatile tools, it is possible to create a whole song. Use the Master screen or the Pattern view to mute/solo the song tracks.

It's **important** to remember that the clips representing the patterns in the Song mode are directly connected with the patterns from the Pattern mode. It's possible to spoil the pattern sequences while fooling around with the clips in Song mode.

There is a **timestamp** indicator at the top bar of all of the screens (besides Pattern view) and is helpful to keep orientation in the Song exact playback time. Show minutes, seconds, patterns, and step numbers. Playback mode **icons** are displayed on section top bars (headers) for easier orientation on what's exactly happening while switching between different screens.

Important:

- Set project **Tempo** in **BPM** (from 40 to 800BPM) by using:
 - Song + Jog-wheel/Arrow keys shortcut,
 - Holding the Tempo screen button + Jog-wheel/Arrow keys,
 - Using the **tap tempo** function (double click to enable, then the next clicks are setting the tempo.
 - Change the BPM value in decimal values (0.1) with the Shift key pressed.
- You can preview a track by holding Shift and pressing the first screen button.
- If you accidentally delete a track, use the 10 levels of **Undo** function available as a screen button.
- Use the Home (Shift + Insert) key shortcut in the Song mode to immediately jump to the top of your composition.
- While the song mode is playing back the rows of pattern's tracks – toggle between the Song mode and the Pattern modes.
- While the sequencer is playing the song mode arrangement – use the Performance mode to apply different effects "on the fly".
- External source MIDI clock and transport in the Song mode will playback the entire song, while in Pattern mode will loop the current pattern.
-

Besides the onscreen Play Pattern and Play Song commands buttons use:

- Play > plays a song,
- Shift + Play > plays the highlighted slot/pattern,
- Shift + Play on a selected slot/pattern clip > **preview** that certain selected clip/track only.

- When switching from the Song mode to Perform mode, the currently played pattern is looped and a "random" indicator icon is displayed on the screen header. This way the Performance mode indicates that tracks from different patterns can be mixed together. Switch back to the Song screen and press **Continue song** to resume playing the entire song.

<https://www.youtube.com/embed/GFB2tL921Ws?feature=oembed>

Master section

<https://www.youtube.com/embed/FYemJgp7oUE?feature=oembed>

Located in the upper right corner **Master** key give access to three screens (marked in the upper left corner of the screen **1/3** to **3/3**). The eight **tracks, live input monitoring** and **send Fx volume mixers** can be accessed here. The Master section is also allowing to **rename** the particular tracks.

Screen **1/3** gives access to a basic function as the main output volume and effects but also offers control over the main output sound enchantments such as 5-band **EQ, Bass Boost, Stereo Enhancer** or the **Limiter** (featuring two different characteristics).

- Volume – main/headphones stereo output volume level in dB + Gain,
- Reverb properties:
 - Size,
 - Damping,
 - Predelay,
 - Diffusion,
- Delay properties (a number indicating the delay rate is corresponding to steps, eg > 16 means that one delay cycle will last for 16 steps):
 - Ping-Pong – on/off,
 - Sync – on/off,
 - Rate – from 8 to 1/32,
 - Time – from 1ms to 3500ms,

- Feedback – from 0 to 70,
- Limiter properties:
 - Attack – from 0.001 to 1s,
 - Release – from 0 to 0.0100s,
 - Threshold – from 0 to 100%,
 - Gain reduce meter,
 - Sidechain – disabled, tracks 1-8, line input L/R,
- EQ – 5-band equalizer with the following tweakable ranges available: 115Hz, 330 Hz, 990 Hz, 3000 Hz, 9900 Hz,
- Bass Boost – slightly (0-5dB) increases 80Hz,
- Space Enhancer,

Screen **2/3** allows control and visual monitoring of the volume in dB and adding **Gain** to the individual tracks and gives access to **Mute** and **Solo** for the desired tracks. It's where it's possible to **rename** tracks.

- Press and hold one or more screen buttons corresponding to chosen tracks and use Arrow keys or Jog-wheel to adjust the volume,
- Use the 8 screen buttons to Mute the corresponding tracks,
- Use the Shift + corresponding screen button in order to Solo the selected track.
- Press the red Rec button + one of eight screen buttons corresponding to the particular tracks in order to **rename** it.

Screen **3/3** allows control and visual monitoring of the volume in dB and adding **Gain** for **Delay, Reverb, Dry Mix and Line input**. Also gives access to their **Mute** and **Solo** functions.

- Press and hold one or more screen buttons corresponding to Send fx mixes and use Arrow keys or Jog-wheel to adjust their volume,
- Use the screen buttons to Mute them,
- Use the Shift + corresponding screen button in order to use the Solo function,

Important:

- **Main Volume shortcut** > Master + jog-wheel,
- Shift + 1 to 8 screen button shortcut will also Mute each of 1 to 8 track in the Pattern screen (not only from the 2/2 Master screen where Solo function works exclusively).
- In the Master section – hold down more than one screen button pressed to edit more than one corresponding value.
- Reverb and Delay **Send fx** can be applied both on the **pre** and **post-volume fader** basis (as a Config choice),

- There are two different types of **Limiters** settings > **Subtle** or **Extreme** (as a Config choice),
- The **Line input** function allows constant monitoring of the incoming audio signal (which is enabled by default). The line input is stereo so it plays through in stereo.
- Master section mixer can be controlled using MIDI CC communicates where:
 - Tracks volume mix – from CC71 to CC78,
 - Delay mix – CC 79,
 - Reverb mix – CC 80,
 - Dry mix – CC 81,
 - Line input – CC 82,

https://www.youtube.com/embed/8VP_2GPfRuU?feature=oembed

<https://www.youtube.com/embed/AfDBT3PTTKI?feature=oembed>

Performance mode

<https://www.youtube.com/embed/NimyYhD0W0s?feature=oembed>

While the classic trackers were mostly about composing music, the Polyend Tracker also introduces a way of performing it. Press **Perform** key to enter this mighty inspiring live pa tool. It's offering a **Green mode**, where making mistakes during a live performance is less likely and a **Red mode** for the performance Fx editing (press Rec key).

Switch Performance template/preset storing mode settings from global to a per-project in the Config menu.

Punch-in effects

Performance mode gives access to many configurable effects at the same time. There are 12 effects slots that give the option to choose the Fx set that suits the desired creative concept (see the available Fx list in the Appendix).

Effects are triggered in real-time using the grid or by MIDI CC input (top row of values). For each of the chosen effects, there are four values > first (—) is off by default and the remaining three positions are customizable. These three are the presets that can be easily turned on by pressing the corresponding grid pad.

The **punch-in effects** are applied only on the chosen track. Use the 8 screen keys to indicate

which tracks are going to be affected. Processed tracks will be marked in red.

Important:

- The effects are applied in correspondence to the pattern or instrument parameters values. When the volume effect value is 10, it means that when it is on, it will add 10 to the value of Volume set in instrument parameters or to the value set in the pattern.
- Customize Performance effects when being in Edit mode (press Rec key). Navigate with the left/right arrow keys and chose the type of effect using the up/down arrow keys and. Try switching effects on different Fx slots by holding Shift and pressing arrow keys.
- When exiting from Performance to Pattern mode, the sequence keeps on playing, but the used Performance effects will become disabled.
- When switching between Performance and Pattern screens, the effect affected tracks indicators are getting back to default/off (this prevents unexpected things to happen when playing live).
- The Pattern Length effect will apply to the length of every track, no matter if they are selected or not.
- **Custom Play Mode Performance Fx** is offering an automatic way of remixing your existing patterns by using predefined algorithmic shuffle play mode of the existing steps.
- The transport bar shows a custom Performance icon to let you know the performance pattern is playing with your chosen effects.
- When switching from the Song mode to Perform mode, the currently played pattern is looped and a "random" indicator icon is displayed on the screen header. This way the Performance mode indicates that tracks from different patterns can be mixed together. Switch back to the Song screen and press **Continue song** to resume playing the entire song.
- Performance mode Fx's can be externally controlled using MIDI CC input communicates from CC51 to CC62 and are represented by the top row of values.

Pattern tracks remixing

<https://www.youtube.com/embed/3JqIIGeaFJO?feature=oembed>

Performance mode is also a convenient and powerful tool to make breakdowns, add live on-the-fly changes to patterns in a Song mode, or even **remix** entire tracks.

On the bottom of the Performance mode screen – find 8 buttons indicating the pattern

number for each track. Selecting the corresponding screen key applies the chosen punch-in effects to this particular track. But there is one more function here which allows you to mix and play different tracks from any of the previously created patterns.

To switch the track pattern, get out from the Edit mode, then hold the desired screen key and use up/down arrow keys.

In the Performance mode, the particular pattern tracks are being changed by holding one or more screen track buttons and using:

- Left/right arrows for a **sequential** change – patterns change after the currently playing pattern phrase reaches its end (pattern number will blink red),
- Up/down arrows and Jog wheel for an **immediate** pattern change.

Important:

- Organize selected performance effects by moving them left and right using the Shift + left/right arrow shortcut when Edit mode is on (Rec).
- Change more than one pattern tracks at the same time, just hold more than one screen keys and use the up/down arrow or the jog-wheel.
- All the changes made in the Performance mode are disabled when exiting the mode.
- When mixing tracks from patterns of different lengths it takes the longest one and loops it whereas the shorter are cut.
- Performance mode track selection can be externally triggered by MIDI CC input communicates from CC41 to CC48.

Audio rendering



Polyend Tracker offers the functionality of rendering audio files directly to the SD card. Choose what is being rendered – single patterns, separate tracks, or entire song mixdown as a one track. Only active tracks will get rendered, Muted tracks will be ignored.

Go to File > **Export** > and choose what needs to get rendered into an audio file (Song, Song stems, Pattern, Pattern stems). The Tracker will play the currently rendered material.

- Song export is about 20% faster and usually faster than wall clock song time,
- Stem rendering takes place one at a time and depending on the project complexity can be time-consuming (around twice the wall clock song time). The timestamp and progress bar is indicating the ongoing rendering. Rendered audio files are saved to the Tracker's SD card root directory Export folder, in a current project's named subfolder.
- While **rendering stems**, the Tracker exports:
 - 8 mono track files,
 - 2 send Fx (Delay, Reverb) mono files,
 - Single master stereo mix file,
- Rendered stems are PCM .wav audio files with a sampling rate of 44100Hz/16bit.
- The volume of separate rendered stems files can be set in the Master 2/3 section. The rendered master track volume is being set in the Master 1/3 section and it's always rendered with the Limiter and its current values.

There's a **Render selection** to sample function accessible from Pattern/sequencer screen. It's a very useful and creative function that allows rendering of a selected step or step selection (on one or more tracks at the same time) into a single audio file. In Pattern section > turn

Edit Mode on (Rec) > use Shift + arrow keys to select the desired area > now use the Render screen button to create a new sample clip.

General & MIDI config



Under the **Config** key, all the Tracker s configuration options are available together with a short description. They are as follows:

- Project Settings:
 - Performance presets – store Perform presets > Global – globally (same settings for all projects), Project – locally (each project has its own presets),
 - Pattern Divider – highlights each chosen step, to give better visual feedback in the pattern > from 1 to 16,
 - Pads Scale filter – see appendix for the list. All scales use equal temperament tuning. Use the chromatic scale for the pads to use all twelve semitones. This gives four full octaves with the base note in the first column of each line.
 - Pads Root Note – from C2 to C4 > determines which note is played by the lowest leftmost pad in the pads grid,
 - Pads Layout – from 1 to 12 > sets how many semitones higher should the pad right above the root note pad be. The root note pad is the lowest leftmost pad in the grid, eg. in layout 1 the pad above the root pad will play the 2nd note of the

chosen scale. In layout 4 the pad above the root pad will play the 5th note of the chosen scale,

- Anti-aliasing – On, Off > disabling anti-aliasing gives the vintage feeling, samples are harsher when detuned heavily,
 - Limiter mode – Subtle, Extreme > determines how the attack and release of the limiter are treated. Subtle limiting gives a more transparent sound but will not be able to catch very sudden changes in amplitude. Extreme limiting reacts much faster which colors the sound.
 - Sends mode – pre-fader, post-fader > pre-fader sends are independent of the instrument volume. This allows the wet signal to be louder than the dry signal. Post-fader sends are proportional to the instrument volume. This gives a more consistent sound when the volume is modulated,
- General configuration:
 - Radio Region – adjusts radio frequencies to the chosen region > Europe, US, Australia,
 - Display Brightness – high, medium, low,
 - Pads Brightness – high, medium, low,
 - Pads preview – Off, Track, Pattern > On the Pattern editor screen, the grid pads can highlight the notes in the active line. Choose between highlighting only the active track's notes, or the entire pattern's active line,
 - Recording options – set what information is stored when recording > Only notes – quantized notes only, Microtiming- notes with microtiming, Velocity- quantized notes with velocity, Microtiming + Velocity – or notes with microtiming and velocity. For recording notes from external MIDI devices. External MIDI recording velocity 0-127 is scaled to V step fx with values from 1 to 50,
 - Hexadecimal numbers – On, Off > enable the throwback hex goodness: pattern step numbers start with 00 and use sixteen digits (A means 10, B means 11, and so on all the way to F which means 15). This allows for easy alignment with music: bars will always start with pattern steps 00, 10, 20, 30, and so on. Each bar's quarter-note beat steps end with the digits ..0, ..4, ..8, and ..C
 - Available MIDI input/output controls:
 - Clock In – Internal, USB, MIDI In jack,
 - Clock Out – Off, USB, MIDI Out jack, USB + MIDI Out, jack,
 - Transport In – Off, USB, MIDI In jack, USB + MIDI In jack,
 - Transport Out – Off, USB, MIDI Out jack, USB + MIDI Out jack,
 - Notes input mode – Off, USB, MIDI In jack, USB + MIDI Out jack,
 - Notes input channel – All, Ch1 to Ch16,

- MIDI Out mode – Off, USB, MIDI Out jack, USB + MIDI Out jack,
 - CC input – Off, USB, MIDI In jack, USB + MIDI In jack (Supported incoming CC messages: CC41 – 48 Performance mode tracks, CC51 – CC62 Performance mode Fx slots, CC71 – CC82 Master mixer levels),
 - CC input channel – inputs from All or MIDI Ch1 to Ch16,
 - Clock sync delay – from -50 to 50 (Allows compensating latency of incoming sync signal. Use this with “Clock in” set to MIDI input jack or USB. Unit is tempo-dependent: 1.0 is 1/250 or a pattern step),
- Metronome: State (on/off), Pre Roll (on/off), Time signature num & denum (from 1 to 12), Volume (from 0 to 100).
 - Firmware: check the current version, **update the firmware** version, and perform the **Config reset** if needed.
 - File transfer: enables Media Transfer Protocol mode which allows browsing files and folders stored on your SD card from a computer level.
 - Manual: view the onboard Polyend Tracker Quick-Start.
 - Credits.

Important:

- Polyend Tracker is equipped with a bidirectional MIDI (class-compliant over USB) implementation and is both able to control and be controlled with external MIDI gear. Its internal PPQN resolution is 192.
- Notice that MIDI Clock is being sent out based on the current tempo, so synchronizing anything over MIDI while using Tempo step Fx will affect the MIDI sync with other instruments.
- The exact MIDI CC (PC, channel aftertouch, or poly aftertouch) settings for the **a – f** step Fx outputs are available in the Instrument Parameters section:
 - Choose an instrument like M01, you can check and edit the available assignments. Each MIDI channel has its own now.
 - While working on the Patterns, you now need to specify which MIDI channel you want for each of the a – f step effects. Choose the MIDI instrument for that step.
 - There are 16 MIDI channels available in the MIDI Instruments from M01 to M16. It's possible to assign six different CCs to each of those channels separately.
- Notes played with an external controller now use constant velocity if “Velocity” is not enabled in the Config's Recording Options.
- Notes played with an external controller passed to a MIDI Instrument are now velocity-sensitive.

MIDI Instrument Parameters				0m : 0s	II	3P	1S	54. MIDI Channel 4	
	0 Bank	0 Bank	0 Bank	0 Bank	52	116			
	1 ModWhl	1 ModWhl	1 ModWhl	1 ModWhl	53	117			
	2 Breath	2 Breath	2 Breath	2 Breath	54	118			
	3	3	3	3	55	119			
	4 Foot	4 Foot	4 Foot	4 Foot	56	120 SOff			
	5 Glide	5 Glide	5 Glide	5 Glide	57	121 Rst			
	6 Data	6 Data	6 Data	6 Data	58	122 Loc1			
	7 ChVol	7 ChVol	7 ChVol	7 ChVol	59	123 NOff			
	8 Balanc	8 Balanc	8 Balanc	8 Balanc	60	124			
	9	9	9	9	61	125			
	10 Pan	10 Pan	10 Pan	10 Pan	62	126			
	11 Expr	11 Expr	11 Expr	11 Expr	63	127			
	12	12	12	12	64 Susta	Prog Chg			
	13	13	13	13	65 Porta	Chan AT			
Velocity	CC A	CC B	CC C	CC D	CC E	CC F			
74	1 ModWhl	5 Glide	7 ChVol	11 Expr	64 Susta	Prog Chg			

Note: In any of the Tracker sections – Press Shift + on/off button to take a screenshot which will get saved directly to the SD card.

Firmware updates



If possible from the software implementation level, Polyend will fix any firmware related issues considered as bugs. Polyend is always keen on hearing user feedback about possible functionality improvements but is not anyhow obligated to bringing such requests to life. We appreciate all the opinions, a lot, but cannot guarantee or promise their appliance. Please respect that.

In order to update the firmware, copy the firmware file to the Firmware folder on SD drive > go to Config > Firmware > choose the desired version of PolyendTrackerFirmware.ptf file and confirm using the screen key.

To copy the firmware files or any other files to the Tracker's microSD card, use one of the following options:

- Attached microSD card USB dongle reader,
- MTP (Media Transfer Protocol) with a direct connection to your computer,
- Polyend Tool,

Find the latest official firmware release [here](#).

Obtain the beta firmware versions files [here](#).

In case of trouble

First and simplest action to try is to disconnect the USB C cable connector from its port on the back panel of the instrument. This usually helps.

But if your device lost power during the upgrade, the SD file structure was damaged, or the firmware doesn't boot up for any other reason, you can perform one of the two emergency flashing procedures as follows:

First method:

- just simply press the hidden reset button on the back panel of the instrument and it will automatically flash with a randomly picked firmware .ptf file from the SD card Firmware/ folder.

Second method:

- download the [Polyend Tool](#),
- download a known working firmware file either from the Polyend website or one of the previous beta .ptf files,
- **important:** remove the SD card from the Tracker,
- connect your Tracker directly to your computer with a USB cable (avoid USB hubs and dongles),
- power up the Tracker,
- in the Polyend Tool, choose the .ptf file you want to flash with,
- use a pin to press the hidden Reset button next to the Tracker's USB C port,
- wait for the firmware update to complete,
- if it's at 100% but the device didn't reboot on its own, do it manually,
- re-insert the SD card to the Tracker's slot,

important: Unit is still crashing? Try this: connect your SD card to your computer and delete the hidden "Workspace" folder.

Warranty & Safety



Polyend warrants this product, to the original owner, to be free of defects in materials or construction for one year from the date of purchase. Proof of purchase is necessary when a warranty claim is processed. Malfunctions resulting from improper power supply voltages, abuse of the product or any other causes determined by Polyend to be the fault of the user won't get covered by this warranty (standard services rates will be applied). All defective products will be replaced or repaired at the discretion of Polyend. Products must be returned directly to Polyend with the customer paying the shipping cost. Polyend implies and accepts no responsibility for harm to a person or apparatus through the operation of this product.

Please go to polyend.com/help in order to start a return to manufacturer authorization, or for any other related inquiries.

Important Safety and Maintenance instructions:

- Avoid exposing the unit to water, rain, moisture. Avoid placing it in direct sunlight or high-temperature sources for a long time.
- Do not use aggressive cleaners on the casing or on the LCD screen. Get rid of dust, dirt and fingerprints using a soft, dry cloth. Disconnect all cables while cleaning. Only reconnect them when the product is totally dry.
- To avoid scratches or damage, never use sharp objects on the body or screen of the Tracker. Do not apply any pressure to display.

- This apparatus, by itself or used with amplifiers, headphones and speakers, is able to produce high sound levels. Do not operate at levels that are uncomfortable. Protect your ears.
- Unplug your instrument from the power sources during lightning storms or when it is not used for long periods of time.
- Make sure that the power cord is safe from harm.
- Do not open up the instrument chassis. It is not user repairable. Leave all servicing to qualified service technicians. Servicing may be required when the unit has been damaged in any way – liquid has been spilt or objects have fallen into the unit, has been dropped or does not operate normally.
- A sound peak occurs on the stereo output of the Polyend Tracker when it's being toggled on/off. You may like to turn down the volume on all speakers and headphones before.

Appendix

The step effects list

While in the Pattern sequencer view, press and hold one of the Fx keys to show the Fx list – using the screen button underneath – expand their description popup.

– – None, indicates that there is no effect used on the desired step.

! – Off, toggles off the effect used on the previous step.

V – Velocity, sets the Velocity of an Instrument. From 0% to 100%.

P – Panning, sets the Panning of an Instrument. From -50 (L) to +50 (R).

M – Micro-tune, sets the micro-tuning adjustments. From -99 cents to +99 cents, works as MIDI too.

G – Glide, sets the time it takes for the pitch of the previous note to travel to the pitch of the corresponding note. From 0-49% (0-1s) to 50-100% (1-15s).

T – Tempo, changes pattern tempo. Handy to create custom swings or grooves. From 10% to 400%. (Notice that MIDI Clock is being sent out based on the current tempo, so synchronizing anything over MIDI while using Tempo step Fx will affect the MIDI sync with other instruments).

m – Micro-move, slightly moves (nudges) forward the step position. from 0% to 100%.

C – Chance, sets a chance of a step being played. From 0% to 100%.

R – Roll, sets the type and value of the (step divider) parameter. From 0 to 16 for each Roll type. R – regular Roll; Rv – decreasing volume Roll; RV – increasing volume Roll; Rn – decreasing note Roll; RN – increasing note Roll; RR – random note Roll.

n – Random Note, sets the range of randomization for Note with each sequencer pass. From +/- 0 to +/- 100. Working accordingly to the global musical scale selected for the pads in Config.

i – Random Instrument, set the range of randomization for Instrument number with each sequencer pass. From +/- 0 to +/- 47.

f – Random Fx value, sets the range of randomization for the Fx that is in the same step with each sequencer pass. For example, if the randomizer value is 10 and the affected Fx value is 100, the algorithm will pick the value from 90 to 110. From +/- 0 to +/-255.

v – Random Volume, sets the range of randomization for Velocity with each sequencer pass. From +/- 0 to +/- 100.

r – Reverse Sample Playback, changes the sample playback direction. Values: <<< and >>>.

p – Position, in relation to the chosen sample playback type – changes the position of Sample start, Wavetable position or Granular position. From 0% to 100%.

S – Slice, sets the slice number of an instrument with a Slice playback type. From 1 to 48.

g – Volume LFO, sets the LFO rate for instrument Volume. LFO is synced to project Tempo. With the following values: 6; 4; 3; 2; 3/2; 1; 3/4; 1/2; 3/8; 1/3; 1/4; 3/16 (3/16); 1/6; 1/8; 1/12 (1/12); 1/16 (1/16); 1/24 (1/24); 1/32 (1/32); 1/48 (1/48); 1/64 (1/64).

h – Panning LFO, Sets the LFO rate for Panning. LFO is synced to project Tempo. Values the same as above.

j – Filter LFO, Sets the LFO rate for the selected filter type. LFO is synced to project Tempo. Values the same as above.

k – Position LFO, Sets the LFO rate for the selected playback type (Wavetable, Granular) Position with respect to the project tempo (BPM). Values the same as above.

l – Finetune LFO, Sets the LFO rate for finetuning value. Values the same as above.

D – Overdrive, sets the amount of Overdrive effect. From 0% to 100%.

L – Low-pass, sets the cutoff amount of the Low-pass Filter. From 0% to 100%.

B – Band-pass, sets the cutoff amount of the Band-pass Filter. From 0% to 100%.

H – High-pass, sets the cutoff amount of the High-pass Filter. From 0% to 100%.

s – Delay, sets the amount of Delay send effect. From 0% to 100%.

t – Reverb, sets the amount of Reverb send effect. From 0% to 100%.

E – Bit Depth, sets the bit depth. From 4 bits to 16 bits.

U – Tune, sets the tuning adjustments. From -24 semitones to 24 semitones.

a – f – MIDI CC or PC, channel aftertouch, or poly aftertouch outputs, sends MIDI values from 0 to 127. In the Instrument Settings, choose an instrument like M01, you can check and edit the available assignments. Each MIDI channel has its own now. While working on the Patterns, you now need to specify which MIDI channel you want for each of a – f step effects. Choose the MIDI instrument for that step. There are 16 MIDI channels available in the MIDI Instruments from M01 to M16. It's possible to assign six different CCs to each of those channels separately.

0 – MIDI Chord – sends many MIDI notes. Numbers represent semitones above the base note. Eg. C-4 047 will play a major chord: C-4 (base note), E-4 (base+4) and G-4 (base+7);

MIDI chord step Fx list

- Sus2 – 027
- Sus2 #5 – 028
- DimTriad – 036

- Min – 037
- Maj – 047
- AugTriad – 048
- Sus4 – 057
- Stack4 – 05A
- Open4 – 05C
- Sus #4 – 067
- Open5 – 07C
- Stack5 – 07E
- Sus2add6 – 0279
- Sus2 b7 – 027A
- Sus2Maj7 – 027B
- Dim7 – 0369
- HalfDim – 036A
- Min b6 – 0378
- Min6 – 0379
- Min7 – 037A
- MinMaj7 – 037B
- Maj6 – 0479
- Dom7 – 047A
- Maj7 – 047B
- Aug add6 – 0489
- Aug b7 – 048A
- AugMaj7 – 048B
- Sus4 b7 – 057A
- Sus4Maj7 – 057B

MIDI CC input chart

Supported incoming CC messages:

- CC41 – CC48 – Performance mode track change,
- CC51 – CC62 – Performance mode Fx slot values,
- CC71 – CC82 – Master section mixer volume levels.
- CC79 – Delay mix
- CC80 – Reverb mix
- CC81 – Dry mix,

- CC82 – Line input,

Performance mode FX list

- Volume (from -100 to 100),
- Panning (from -100 to 100),
- Tune (from -48 to 48),
- Low-pass filter cutoff (from -100 to 100),
- High-pass filter cutoff (from -100 to 100),
- Band-pass filter cutoff (from -100 to 100),
- Delay Fx send (from -100 to 100),
- Reverb Fx send (from -100 to 100),
- Sample position (from -100 to 100),
- Sample end (from -100 to 100),
- Sample playback Forward (>>>>) and Reverse (<<<<),
- Volume LFO Speed (from -28 to +28),
- Panning LFO Speed (from -28 to +28),
- Finetune LFO Speed (from -28 to +28),
- Filter LFO Speed (from -28 to +28),
- Granular/wavetable LFO Speed (from -28 to +28),
- Step repeater (from 16 to 1/16),
- Pattern play mode (Forward, Backward, Random, Custom 1 – 10),
- Pattern length (from 1 to 128),
- Bit Depth (from -12 to +12),
- Overdrive (from -100 to +100).

Musical scales filters

Number, Name – Abbreviation.

- 1 Chromatic – Chromatic
- 2 Minor – Minor
- 3 Major – Major
- 4 Dorian – Dorian
- 5 Lydian – Lyd Maj
- 6 Lydian Minor – Lyd Min

- 7 Locrian – Locrian
- 8 Phrygian – Phrygian
- 9 Phrygian Dominant – PhrygDom
- 10 Mixlydian – Mixlydian
- 11 Melodic Minor – Melo Min
- 12 Harmonic Minor – Harm Min
- 13 BeBop Major – BeBopMaj
- 14 BeBop Dorian – BeBopDor
- 15 BeBop Mixlydian – BeBopMix
- 16 Blues Minor – Blues Min
- 17 Blues Major – Blues Maj
- 18 Pentatonic Minor – Penta Min
- 19 Pentatonic Major – Penta Maj
- 20 Hungarian Minor – Hung Min
- 21 Ukrainian – Ukrainian
- 22 Marva – Marva
- 23 Todi – Todi
- 24 Whole Tone – Wholetone
- 25 Diminished – Dim
- 26 Super Locrian – SLocrian
- 27 Hirajoshi – Hirajoshi
- 28 In Sen – In Sen
- 29 Yo – Yo
- 30 Iwato – Iwato
- 31 Whole Half – WholeHalf
- 32 Kumoi – Kumoi
- 33 Overtone – Overtone
- 34 Double Harmonic – DoubHarm
- 35 Indian – Indian
- 36 Gypsy – Gypsy
- 37 Neapolitan – NeapoMaj
- 38 Neapolitan Minor – NeapoMin
- 39 Enigmatic – Enigmatic

What's in the box?

Polyend Tracker onboard original accessories.

- USB-A power adapter (with different standard plugs set),
- USB-C cable (2 m),
- Audio 3.5 mm jack to 2x 6.3 mm jack adapter,
- MIDI 3.5 mm jack to MIDI DIN adapter,
- 16GB Micro SD Card,
- Micro SD to USB-A dongle adapter,
- Warranty and manual information card,
- Dust cloth.



All the onboard Polyend Tracker demo songs compositions prepared by various artist and samples included in these works are licensed under a [Creative Commons Attribution-NonCommercial 4.0 International license](#).