KEYSTEP PRO
Controller & Sequencer

ARTURIA
_The sound explorers

Special Thanks

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Product version: 1.0

Revision date: 14 April 2020

Thank you for purchasing the Arturia KeyStep Pro!

This manual covers the features and operation of Arturia's **KeyStep Pro**. KeyStep Pro is a full-featured standalone keyboard controller complete with four polyphonic sequencers, four arpeggiators, a wide-ranging set of USB, MIDI and CV connections and our Slimkey keyboard that provides maximum playability with a minimal footprint.

KeyStep Pro is designed for the electronic musician looking for a reliable hardware product that will give them fast hands-on control over up to four devices at once. Each device can be played directly through the keyboard or controlled by one of the four sequencers/arpeggiators. Devices can also be controlled through USB, two independent MIDI outputs or four sets of CV and Gate outputs, giving users the ability to control nearly any kind of electronic musical instrument available today.

In this package you will find:

- One KeyStep Pro controller, with a serial number and unlock code on the bottom. You will need this information in order to register your KeyStep Pro.
- One "worldwide" power supply with interchangeable leads
- One USB cable
- The Quick Start Guide for KeyStep Pro

Also included in the purchase of your KeyStep Pro is a free installation of Ableton Live Lite, a remarkably full-featured recording / sequencing application. The license number will be provided to you when you register your KeyStep Pro on the Arturia website. After registration, you can download the installation file from ableton.com/live-lite.

Be sure to register your KeyStep Pro as soon as possible! There is a sticker on the bottom panel that contains the serial number of your unit and an unlock code. These are required during the online registration process. You may want to record these elsewhere or take a photo of the sticker in case it becomes damaged.

Registering your KeyStep Pro provides the following benefits:

- A product license key for your installation of Ableton Live Lite
- Access to the latest version of the MIDI Control Center software
- Special offers restricted to KeyStep Pro owners

Special Message Section

Specifications Subject to Change:

The information contained in this manual is believed to be correct at the time of printing. However, Arturia reserves the right to change or modify any of the specifications without notice or obligation to update the hardware that has been purchased.

IMPORTANT:

The product and its software, when used in combination with an amplifier, headphones or speakers, may be able to produce sound levels that could cause permanent hearing loss. DO NOT operate for long periods of time at a high level or at a level that is uncomfortable.

If you encounter any hearing loss or ringing in the ears, you should consult an audiologist.

NOTICE:

Service charges incurred due to a lack of knowledge relating to how a function or feature works (when the product is operating as designed) are not covered by the manufacturer's warranty, and are therefore the owner's responsibility. Please study this manual carefully and consult your dealer before requesting service.

Precautions include, but are not limited to, the following:

1. Read and understand all the instructions.
2. Always follow the instructions on the instrument.
3. Before cleaning the instrument, always remove the USB and power cables. When cleaning, use a soft and dry cloth. Do not use gasoline, alcohol, acetone, turpentine or any other organic solutions; do not use a liquid cleaner, spray or cloth that is too wet.
4. Do not use the instrument near water or moisture, such as a bathtub, sink, swimming pool or similar place.
5. Do not place the instrument in an unstable position where it might accidentally fall over.
6. Do not place heavy objects on the instrument. Do not block openings or vents of the instrument; these locations are used for air circulation to prevent the instrument from overheating. Do not place the instrument near a heat vent at any location with poor air circulation.
7. Do not open or insert anything into the instrument that may cause a fire or electrical shock.
8. Do not spill any kind of liquid onto the instrument.
9. Always take the instrument to a qualified service center. You will invalidate your warranty if you open and remove the cover, and improper assembly may cause electrical shock or other malfunctions.
10. Do not use the instrument with thunder and lightning present; otherwise it may cause long distance electrical shock.
11. Do not expose the instrument to hot sunlight.
12. Do not use the instrument when there is a gas leak nearby.
13. Arturia is not responsible for any damage or data loss caused by improper operation of the instrument.

Introduction

Congratulations on your purchase of the Arturia KeyStep Pro!

This fantastic keyboard controller gives you everything you need to quickly and easily control up to four devices (virtual instruments, hardware synthesizers, modular synthesizers or drum machines) at once. Its standalone design means that you can use it with or without a computer and its four powerful sequencers/arpeggiators are sure to spark interesting musical ideas and capture your best performances.

All the essential features of a professional keyboard controller are here, including aftertouch, pitch and modulation touch-strips, and clearly labeled buttons and knobs that are sensibly laid out for fast, intuitive access. The Slimkey keyboard features great-feeling keys that are smaller than standard piano keys but still large enough to allow for maximum playability across multiple octaves. These keys make the product smaller and more portable but—make no mistake—KeyStep Pro is built like a tank so that it can be taken on tour with confidence.

We hope the four polyphonic sequencers will unleash your most interesting musical ideas. The RGB LED indicators above each key give you immediate visual feedback of exactly what each sequencer is doing. You can specify the exact pitch, length, velocity, timing and randomness of a sequence step through touch-sensitive knobs with surrounding indicator LED rings. The dedicated note tie, transposition, overdubbing and hold buttons bring immediacy and power to the sequencers. You can even set independent lengths for each of the four sequencers for amazing polyrhythmic fun! Breath new life in your sequences by playing them in a different key. Transpose them intelligently, they'll remain in key during transpose. Invert them, Shift them forward or backwards in time. Then send it all out on the four Voices to your Modular system.

The arpeggiators have many inspiring modes of operation beyond the basic (up/down) modes. The HOLD function lets you easily create complex arpeggiations with up to 32 notes (!) and the step timing can be manipulated in realtime. Experiment with Arpeggiators like you've never done before! Create and mix the output of three arpeggiators playing simultaneously. Mix arpeggios playing at different speeds.Finally, the scale quantization and chord memory features will make you seem like even more of a musical monster than you already are!

Use the Drum track to create complex polymeter rhythms; rhythms of different lengths playing on 24 channels. Or use the first 8 channels to trigger drum units on your modular system. Use the control tracks of the four sequencers to control filters, envelope stages, reverb times on your external synths.

All of its features are one SHIFT/CLICK away. There's no menu diving. If you need to change settings there's a configuration menu, but it's a set and forget thing. The real stuff that makes your music come to life is always at your fingertips. And what features they are! Four sequencers, that can play huge stacked chords in every step. Advanced step editing; take the chord stored in a step and change only the notes you want to change in that chord.

In addition to the standard MIDI ports, there is a second MIDI port that you use to control more gear or a DMX light controller.

KeyStep Pro has a massive number of uses thanks to its simultaneous USB, MIDI, CV/Gate connections. Each of the its four tracks can output on USB, MIDI or CV/Gate simultaneously. Each track on KeyStep Pro has control voltage (CV) outputs for Pitch, Gate and an extra "modulation" CV output that allows for more creative sound design by letting you control things like controlling velocity, filter cutoff, or any other parameter of your choosing. The first track of KeyStep Pro can be set to function as a drum or "trigger" sequencer with 8 separate CV gate outputs that you can use with analog drum machines or your modular synthesizer.

The powerful synchronization features let you use KeyStep Pro as a master clock source or to have it synchronize itself to incoming USB, MIDI or CV synchronization signals. KeyStep Pro can send and receive clock signals and even has a separate clock reset CV output jack so that your external analog gear always remains firmly synchronized in both tempo *and* phase (loops and sequences always start on the "one" together).

Our MIDI Control Center (MCC) software allows you to dive deep into the KeyStep Pro's features and to reconfigure the product so that it works best for you and your setup. MCC really opens up a lot of options and we have dedicated an entire chapter of this guide so that you can understand all of the powerful options.

The Keystep Pro is a USB MIDI Class Compliant device. What does that mean and why is it important? It means you can connect it to any other MIDI Class Compliant device without having to install drivers. Only when connecting to an iPad you will need a camera connection cable or a USB to lightning cable. Arturia has a great line of iPad synthesizers such as the iMini, the iSem, the iProphet and the iSpark. It's worth checking them out.

Be sure to visit www.arturia.com. That's the place to go for the latest firmware and to download the MIDI Control Center. You'll also find links to our tutorials and FAQs.

KeyStep Pro is easy to use, so you'll probably start experimenting with it right out of the box. However, please be sure to read this manual even if you are an experienced user as we describe many useful tips that will help you get the most out of your purchase. We're sure you will find KeyStep Pro to be a great source of musical inspiration and we hope you'll use it to its fullest potential.

Happy music making!

The Arturia team

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1. WELCOME AND INTRODUCTION

The Keystep Pro is an advanced third-generation controller and sequencing station. It is both compact and versatile, with unique features that will spark your imagination and creativity in a new way. It enables you to connect to all your studio and performance gear and control it in ways you never thought possible.

Controllers have come a long way. The first generation of controllers could transmit MIDI pitch and velocity over the 16 MIDI channels, not much more. The second generation added complex step- and real-time sequencing features and was capable of connecting to your DAW in special ways, allowing you to control multiple parameters of VSTi's (virtual instruments, including synths).

This third-generation controller adds control options for modular systems. The Keystep Pro has four tracks each with CV, velocity/modulation and gate output. You can employ each of these tracks as a melodic sequencer, arpeggiator or drum sequencer. It lets you play, record edit and add to your sequences on the fly, with a clear and easy-to-understand workflow that encourages your creativity. Each pattern can be up to 64 steps long. You can chain up to 16 patterns together for live performances or jamming. The Scenes feature enables you to save and recall configuration states. It's a lifesaver if you need to quickly change from one setup to another. Couple this with the advanced chord options and scale quantisation and you'll begin to understand why it will soon become your favourite controller.

1.1. A fascinating adventure

As soon as you start experimenting with the Keystep Pro, you'll be faced with many questions: How do I make connections? What are the difference between Real-time and Step recording?

The answers to these questions come slowly: you'll find many of the answers in this manual and many others by reading online forums, sharing and comparing user experiences and, most importantly, by diving in and experimenting. Whatever you do, take the time to get to know the Keystep Pro inside out.

To sustain the fascination you feel, learn the functions of the Keystep Pro one by one and test your knowledge continuously. The Keystep Pro is an advanced controller with many levels of understanding. It offers a unique way to experience the reward that comes with being able to create the sounds as you imagine them.

1.2. About reading manuals

Reading manuals can mean much more than familiarizing yourself with an instrument. Yes, it is excellent for learning, but it serves another purpose that is much less understood: creating the basis for inspiration.

Inspiration can flourish when you have many little pieces of knowledge 'online' in your mind, so that you can interconnect and crosslink them; it widens the scope of your creativity. It also helps to look at the current state of your knowledge as something that needs to be maintained and expanded. Reading a manual, again and again, causes a quantum shift in what you absorb from it. You are building a living model of the controller in your brain.

Reading a manual the first time helps you to get acquainted with the parameters of an instrument; what does a knob do and how does it affect the sound of external modules or synths? Second and third readings will give you a better understanding of the structure of the Keystep Pro. Beyond that, reading becomes a source of creative input that inspires you to think of new ways to use this unique controller and sequencing station.

2. INSTALLATION

2.1. Usage Precautions

The Keystep Pro uses an external power adapter. Do not use any power supply or adapter other than the unit provided by Arturia. Arturia accepts no responsibility for damage caused by the use of an unauthorized power supply.

2.2. Warning

Do not place this product in a place or position where anyone might walk on, trip over, or roll anything over power cords or connecting cables. The use of an extension cord is not recommended. However, if you must use one, make sure that the cord can handle the maximum current needed by this product. Please consult a local electrician for more information on your power requirements. This product should be used only with accessories supplied or recommended by Arturia. When used with any such products, please observe all safety markings and instructions that accompany them.

2.3. Register your Instrument

Registering your instrument establishes your legal ownership of it, which entitles you to access the Arturia Technical Support service and to be informed of updates. Additionally, you can subscribe to the Arturia newsletter to be informed of Arturia-related news as well as promotional offers. Connect to your Arturia account, go to the section My Registered Products, then add the Keystep Pro by entering its serial number, as printed on the sticker located under the controller.

2.4. Connecting the KeyStep Pro to the World

Always power-off all audio gear before making any connections. Failing to do so may damage your speakers, the Keystep Pro, or the other audio equipment. After completing all connections, set all volume levels to zero. Power-on the various devices, with your audio amplifier or monitoring system last, then raise the volumes to a comfortable listening level.

Here is an overview of the Keystep Pro connectors:

Purpose	Connector type
MIDI input (1x)	5-pin DIN connector
MIDI outputs (2x)	5-pin DIN connectors
USB	Standard USB type B
Power	DC input: internal Ø 2.1 mm, external Ø 5.5 mm

3. BASIC OPERATIONS

3.1. Plug and Play

Connect the KeyStep Pro to your computer or an external device as shown in the image below and you're ready to go! Here are a few pointers to make the most of your first session.
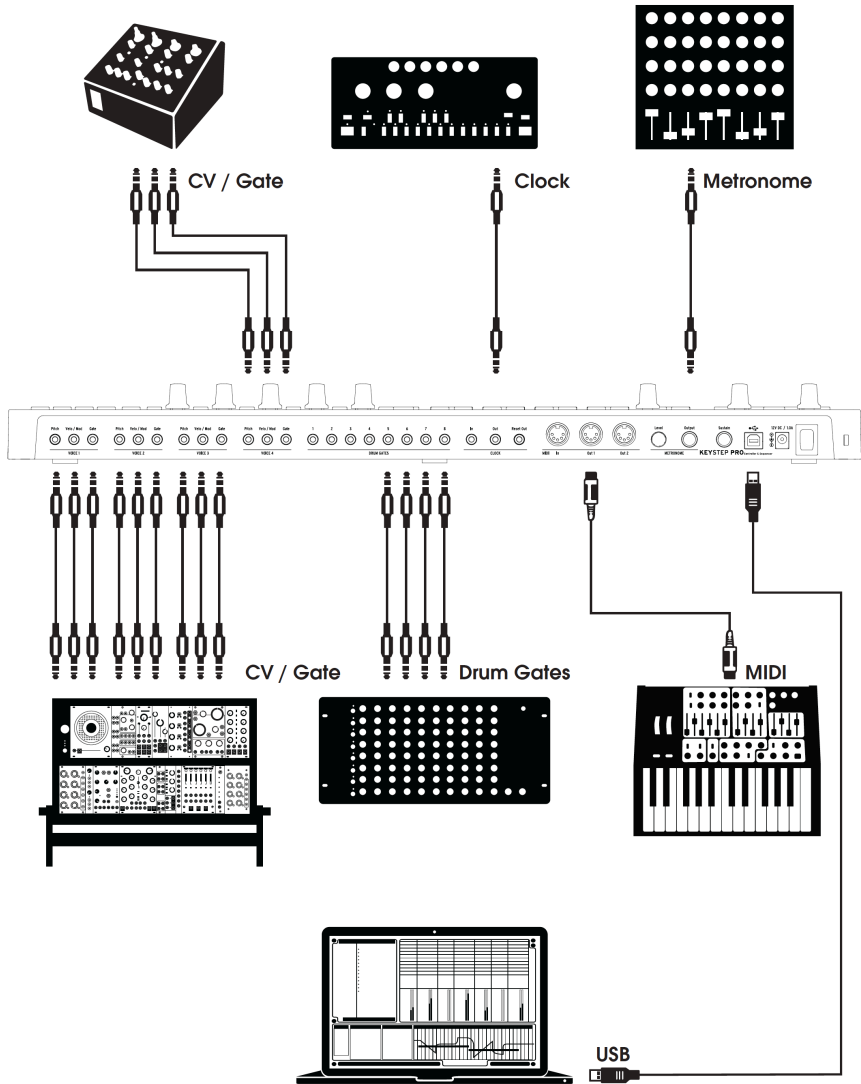
3.1.1. Slimkey Keyboard

The Slimkey keyboard is both velocity- and pressure-sensitive (sometimes called aftertouch). You can specify the velocity curve and aftertouch response using the MIDI Control Center and the Utility menu. Refer to Chapter 9 [p.116] for details.

3.1.2. Keyboard MIDI Channel Selection

The KeyStep Pro can transmit notes and other MIDI messages on 32 channels numbered from 1 to 32. Each of the four tracks of the KeyStep Pro transmits on its own channel: Track 1 on MIDI channel 1, and Tracks 2, 3 and 4 on MIDI channels 2, 3 and 4, respectively. Track 1 is a special case because it has both a melodic sequencer and a drum sequencer. When in sequencer mode, Track 1 transmits on MIDI channel 1; when in Drum mode it transmits on MIDI channel 10. Most MIDI devices default to receiving on MIDI channel 1, so connecting an external device and playing notes on Track 1 will usually trigger a response from the external device.

> ♪: If the external device does not respond, that may be because it is set to a MIDI channel that doesn't match the current KeyStep Pro MIDI channel. First check the MIDI channel setting of the external device. If the channels do not match and you want to set the KeyStep Pro to another MIDI channel, you'll have to go into the Utility menu.

In the Utility menu, you can set all the configuration options of the KeyStep Pro, including the MIDI transmit functions. Like most fine-tune functions on the KeyStep Pro, you access it with the SHIFT key. SHIFT functions are printed in blue and can usually be found below buttons. In this case, the Utility function sits under the Project button. - Hold SHIFT + Project (Utility), the Utility menu will light up
- Turn the selection encoder to scroll down to 'MIDI channels' - Now push the selection button, and scroll down to Track 1 output, push once more and select the MIDI channel you want to transmit on - Press SHIFT + Exit repeatedly to exit Utility

3.1.3. Pitch and Mod Touch Strips

The Pitch and Mod touch strips are similar to standard wheels in how they work, except that you slide your finger backward or forward along the strip instead of rotating a wheel.
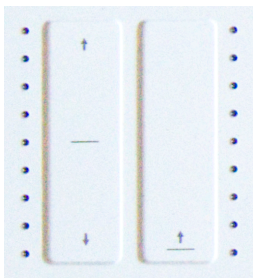
3.1.3.1. The Pitch Strip

The Pitch strip has a center zone in which slight finger movements produce no change. Moving your finger forward bends the pitch upward, and moving it backward bends the pitch downward. When you lift your finger, the Pitch bend value snaps back to zero.

3.1.3.2. The Mod Strip

The Mod strip works like a mod wheel: from minimum to maximum. Placing your finger at the bottom of the Mod strip (the end closest to you) produces no modulation, and moving your finger all the way up (to the end furthest from you) causes maximum modulation. The Mod strip differs from the Pitch strip in that it does not snap to zero when you lift your finger.

3.1.4. The HOLD Button

The HOLD button enables the Arpeggiator to keep playing after you take your fingers off the keys. But there's another way to use it: while HOLD mode is active, you can keep adding notes to an arpeggio as long as you continue holding down at least one key.

For an in-depth look at the Arpeggiator, refer to chapter 5 [p.51].

3.1.5. Sustain Pedal

If you have a momentary footswitch, plug it into the Sustain jack socket on the rear panel. If it works the wrong way around, disconnect KeyStep Pro from its power source and then reconnect it. KeyStep Pro will sense the polarity of the pedal, and it should work fine after that.

There are several configuration options for the Sustain pedal in the The MIDI Control Center [p.124].

3.1.6. Octave - / Octave +

Pushing one of the Octave select buttons will transpose the keyboard pitch by as much as two octaves up or down. To reset the keyboard octave shift back to zero, press both buttons simultaneously.
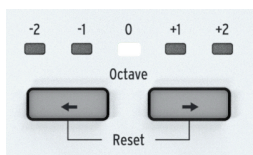
3.2. Record and Play a Sequence

The KeyStep Pro features four (!) sequencers; one on each track. Let's record something on Track 1:
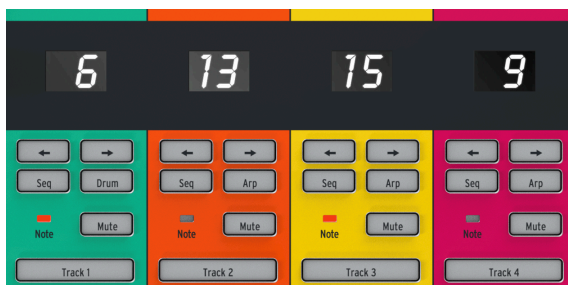
- Press the Track 1 button; it will light up in green
- Select 'Seq' on this track if it isn't selected already
- Now hold the 'Record' button and press the 'Play' button; the step buttons' LEDs now become active and cycle from Step 1 to Step 16 continuously. We are about to create our first sequence pattern. Each track can hold 16 of these patterns.

The sequencer is in loop mode, so press a few keys and they will be added to the loop. The KeyStep Pro sequencers are polyphonic, so pressing a chord instead of a single note will enter it into the loop. Notice that all notes are recorded with the velocity at which you play them.

At this point, you can start to 'play around' with your sequence. When you look carefully, you'll see sequence modifiers printed in blue under the step buttons. - Hold the SHIFT key (the leftmost button on the KeyStep Pro) and press 'Semi Up' or 'Semi Down' and hear how your sequence is transposed up or down in semitones (half steps) on the fly.

There are a few other things to try here: SHIFT + Invert will create a mirror image of your sequence. The last notes will become the first and vice versa. Press SHIFT + Invert once more to restore the natural order of things (:-)).

It does not stop here: you can shift the looping sequence as a whole one step to the left or right. To shift to the right, hold SHIFT and press Nudge>. A note in the first position of the loop will move to the second position; a note in the last position will wrap around to the first position.

You can make adjustments to the tempo in quantized 1 BPM increments by turning the Tempo knob. If you need to make finer adjustments, hold SHIFT and turn the Tempo knob. This will increment and decrement the tempo in 0.01 steps.

3.2.1. Time Division

There's another row of blue shift modifiers printed above the keys of the keyboard. In the centre, right above the 'middle C' key, you'll find a series of time-division options, ranging from 1/4 to 1/32. To change the current time division, hold SHIFT and press the appropriate key on the keyboard. What happens now is that you change the rhythmic relationship of the sequence relative to the tempo: quarter notes (one step per beat), eighth notes (two steps per beat), and so on. Triplet values are also an option (1/4T, 1/8T, etc.); if you're already in 1/8 then press SHIFT+Triplet, you'll get into 1/8 triplet mode.

There's a lot of potential for creative fun here. In Chapter 5 [p.51], we'll show you how to copy the pattern of one sequence to another sequence. Imagine starting with a simple pattern, copying it to the three other sequencers, modifying those copies with Invert, Nudge and Transpose, then running them simultaneously with the first sequence. You get the idea …

3.3. Using the Arpeggiator

An arpeggio is a chord of which you repeatedly play the individual notes. It's what you hear when you hold a chord on a guitar and pluck the strings from top to bottom or the other way around. A major part of learning to play the guitar is figuring out how to play different fingerpicking/arpeggio styles. The arpeggiators on the KeyStep Pro do all these things for you. Each KeyStep Pro track, except Track 1, has an arpeggiator.

To play an arpeggio, activate a track (try Track 2), press the Arp button then hold down a chord. Now press the 'Play' button and your arpeggio will start. It's rather tiresome to hold keys down, especially if what you really want is to change your arpeggio, or if you want to tweak parameters on your modular system or synth that is connected to the KeyStep Pro. Pressing HOLD lets you lift your fingers off the keys without stopping the arpeggio. What's more, once HOLD is active and if you keep at least one key pressed down, you can add notes to the arpeggio; just press one or more keys and the note(s) and its/their velocity will be added to the arpeggio. You can add up to 16 notes to an arpeggio.

Again, there's a lot to discover here, so try some of these:

- SHIFT + Arp to change the 'strum' pattern of your arpeggio

- SHIFT + Time Division (1/4th, 1/8th, 1/16th, 1/32th)

- SHIFT + Scale. Selecting another scale will instantly change the tonal focus of your arpeggio.

And there's even more: the Gate, Velocity and Randomness encoders! Tweaking the Gate knob will lengthen or shorten the gate time, Velocity will add or subtract (surprise!) velocity, and Randomness will inject random notes into your arpeggio. Press the Play/Pause button again to pause the arpeggio pattern; press it once more to resume playback from where you stopped.

3.4. Scales & Chords

Some of the most interesting features of the KeyStep Pro are its scale and chord options, which we'll cover in more detail in Chapter 5 [p.51], but to get an idea of the impact they have on your sequences and arpeggios, try this neat trick while your sequence or arpeggio is running.

Let's try this in Track 2:

- Activate Track 2 by pressing its button

- Hold SHIFT + (Scale)-minor. The Scale selectors are located just above the keyboard. For example, you activate the minor scale with SHIFT + C4 (the third 'C' from the left.) Try some of the other Scale selectors to hear the different types of scale.

Chord mode is equality fascinating: - Stop everything that's playing by pressing the 'Stop' button - Hold SHIFT +Tie/Rest (Chord) and play a chord - Release all the keys of the chord - Let go of the SHIFT + Chord buttons - Play any key on the keyboard

If, for example, you still have the minor scale selected, as explained above, any key you play on the keyboard will generate a minor chord! Can you arpeggiate this chord and thus create an arpeggiated minor chord? Yes, of course you can!

3.5. Creating Splits

You could have an arpeggio play on the lower part of the keyboard and a sequence on the upper part. How? By creating a keyboard split.

- Hold down the two track buttons of the tracks that you want to be part of the split. The track button you press first will be assigned to the upper part of the keyboard, the other one to the lower part. For example, if you want the sequence on Track 1 to play in the upper part, you need to press the Track 1 button first.
- While holding down both track buttons, press an appropriate key on the keyboard to select the split point.

> ♪: If at a later moment you want to check where the split point is, press the same two track buttons simultaneously. The KeyStep Pro will display the ranges in the colour of the tracks that are part of the split. Press the split key once more to deactivate the split.

We'll cover all these features in more depth in Chapter 6 [p.90].

4. KEYSTEP PRO OVERVIEW

In this chapter, we'll guide you through the front and back panels and explain the functions of all the knobs and connections on these panels. It's a reference chapter. If you're eager to start exploring your KeyStep Pro and want to dive right in, continue to Chapter 5 [p.51], where you can learn how to use the sequencers and the arpeggiators. This chapter is mainly for reference; you can return here if you need to know more about a specific function, knob, strip, connection or menu.

4.1. Making the Connections

There are countless ways to connect the KeyStep Pro with your music-making gear. It's impossible to cover every scenario in this guide, but here are some typical setups:
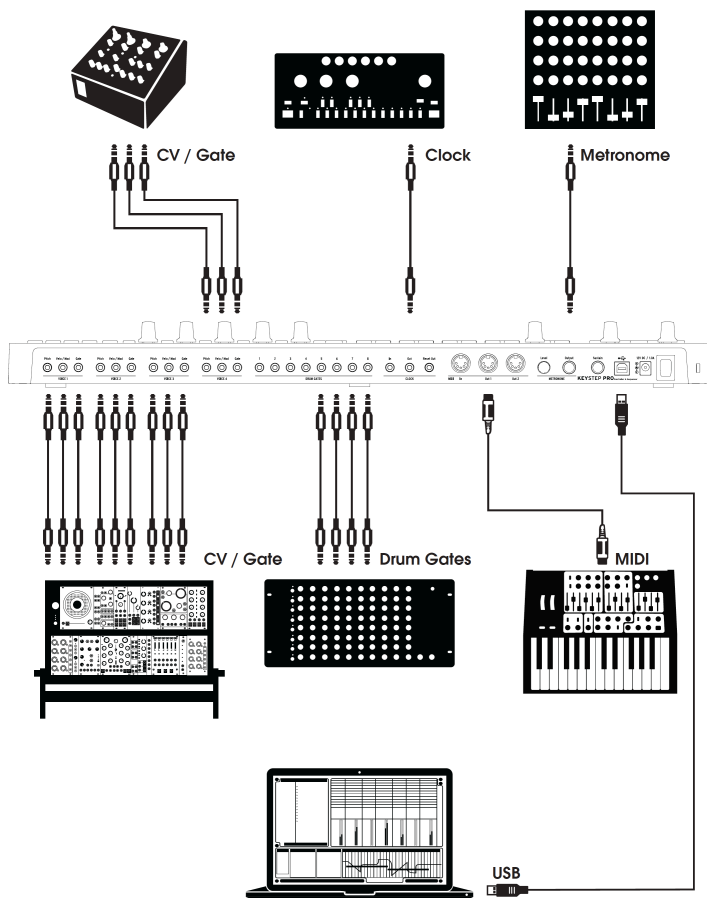
4.1.1. ... with a Computer

The KeyStep Pro is a USB class-compliant controller, so at its most basic level it can be connected to any computer with a USB port, through which it receives its DC power supply, and can be used as an input device for various applications. The downloadable MIDI Control Center software lets you choose which MIDI messages will be sent by the mod strip and also enables you to specify global KeyStep Pro parameters.

However, the KeyStep Pro can also be used in standalone mode without a computer connected! In this case, simply use the provided 12V DC power supply adaptor.

WARNING!: Although the KeyStep Pro might seem to work OK when you power it up with a powerbank, we strongly advise you NOT to power it this way. The KeyStep Pro needs a lot of current for its LEDs and analog output. Using a defective or partially charged powerbank could damage the KeyStep Pro.

4.1.2. ... with External Devices

As shown above, you can connect the KeyStep Pro to a variety of synths, drum machines and/or Eurorack modules.

- When connecting to a synth, use one of the two MIDI Out ports. If you need to connect to more than two synths, you can daisy chain them: connect the KeyStep Pro to the MIDI In of the first synth and then connect the MIDI Thru of that synth to the MIDI In of the second synth, etc. Daisy chaining allows you to connect as many as 16 synths to one MIDI Out.
- An increasing number of modern synths have both MIDI Ins and Analog Ins, for example the Arturia MiniBrute 2 and MiniBrute 2S. They enable you to use a mix of MIDI and analog connections.
- When connecting to a Drum machine such as the DrumBrute, you have two options: MIDI Out only or a mix of MIDI and Analog Outs. The KeyStep Pro has eight analog drum-trigger outputs (Drum Gates) that you can play with the lower eight keys of the KeyStep Pro keyboard.
- If you have a Eurorack system, you can connect the KeyStep Pro's four Voice outputs to various Eurorack inputs. Please refer to Chapter 10 for examples of how to set up these connections.

4.1.3. ...with an iPad®

Add a camera connection kit and the KeyStep Pro becomes the perfect companion for an iPad. This enables it to be used as a controller for Arturia's iMini, iSem or iProphet applications, for example.

If you have an iPad but don't already own those great virtual instruments, please take a look at them on our website! They are very affordable and live up to Arturia's reputation for accurately modelling the sound of analog synthesizers with warmth and precision.

As you can see, KeyStep Pro can be the controlling hub of some amazing systems!

4.1.4. Analog Connections (CV and Gate)

KeyStep Pro can send control voltages (CV) to modular synthesizers and other non-MIDI devices through its four sets of Pitch, Velo/Mod and Gate connectors on the back panel. Each of the KeyStep Pro's four tracks has its own dedicated set of connectors, allowing you to hook up to and control as many as four devices at the same time!

4.1.4.1. Control Voltages: Pitch, Velo/Mod and Gate

When the sequencers are running or you play a single note or multiple notes on the keyboard, each note is translated immediately into Pitch, Control Voltage (Velocity or Modulation) and Gate signals and sent to the four Voice outputs on the back panel. When you play the keyboard or the sequencers in polyphonic mode, the KeyStep Pro's CV routing options allow you to define how these signals from the four voices will be distributed.

CV Gate outputs

For each note, three independent voltages are sent: Pitch, Velo/Mod and Gate. The Velo/Mod voltage can be either velocity or modulation, depending on what you have selected in the Utility section or in the MIDI Control Center.

Some analog synthesizers have unusual implementations that are not fully compatible with the KeyStep Pro's CV and Gate signals. Before purchasing an analog synth, please refer to its manufacturer's specifications to ensure that the two devices will work together well.

We've designed the KeyStep Pro to be as flexible as possible: the downloadable MIDI Control Center [p.124], which you can install on your computer, allows you to configure the response of the CV/Gate jacks in a number of ways: by default, the transmitted pitch voltage is compatible with the 1.0 V per octave standard, which means that if you play an octave interval on the KeyStep Pro keyboard, the connected synth(s) or Eurorack module(s) should also play an octave interval. In other words, the 'pitch tracking' is correct. However, some synths use a 1.2 V per octave or a Hertz per Volt (Hz/V) standard. To control such beasts, you have to change the corresponding setting in the MIDI Control Center.

Gate signals can also have quite different output ranges (S-Trig, V-Trig 5V or V-trig 10V). These too can be set up in the MIDI Control Center.

The four Voice outputs can be set to transmit either velocity or aftertouch modulation. You can change this in Utility>CV Settings.

By default, the control voltages sent to the Voice outputs match the 1.0 V per octave standard. It's a standard that was defined in the early days of electronic music history. It simply means that a 1.0 Volt increase in signal level makes an oscillator rise one octave in pitch. This is the most commonly used standard. Please refer to the manufacturer's documentation of your external music-making gear if you cannot get external oscillators to track correctly. Changing the CV Pitch output setting may well solve the problem.

For each of the KeyStep Pro's four tracks, the Pitch control voltage (CV) can be set separately in Utility>CV>Track (1-4) to:

- 1.0 Volt/Octave (0-10V)

- 1.2 Volt/Octave

- Hertz per Volt

4.1.5. MIDI Connections

Much of the 'mid-vintage' music hardware from the 1980s and 1990s had MIDI DIN jacks but not CV/Gate connectors or USB ports. KeyStep Pro can be plugged directly into such devices, letting you control them using its powerful sequencers, arpeggiators and other controls (keys, knobs, touch strips, etc.)

4.1.5.1. Connecting to a DAW

The KeyStep Pro is an ideal controller for your DAW because you can use its four Voice outputs to separately control instruments loaded on four tracks of your DAW simultaneously. Below, we give an example of how to set up Ableton if you want to control instruments via four MIDI channels.

Connect the KeyStep Pro to a USB port on your computer using the supplied USB host cable.

We first have to 'tell' Ableton that we want to use the KeyStep Pro as a controller in Ableton:

- Open 'Preferences' in the 'Live' menu.
- Select 'Link/MIDI'.
- Select 'KeyStep Pro' as control surface. If the KeyStep Pro is not in the dropdown list, try selecting Beatstep as the controller.
- Select KeyStep Pro in the input field and the output field.
- In the MIDI ports section below the input and output fields, select Input BeatStep (or KeyStep Pro) and tick all the boxes.
- Do the same in the Output: BeatStep (or KeyStep Pro).

We're done; Ableton is now able to correctly interpret the (MIDI) control signals arriving from the KeyStep Pro and we're now ready to make some noise!

- Open Ableton and select 'New live set' to create an empty set.
- Delete the two default audio tracks by selecting them and clicking 'delete' in the 'Edit' menu.
- Select ' Insert MIDI track' from the 'Create' menu and repeat this one more time to create two empty MIDI tracks. As an alternative, you can right-click in the empty track space and insert two MIDI tracks.
- Drag a sound from Category>Sounds to Track 1. Repeat this for Tracks 2 to 4.

You should now have four MIDI tracks, each with its own virtual instrument loaded. There's nothing to hear yet because we haven't made the connection from the KeyStep Pro to Ableton. Let's do that now:

- Focus on Ableton track 1 and click on the downward arrow in the 'All ins' dropdown menu listed below 'MIDI From'.
- Select KeyStep Pro from the listed options.
- Select channel 1 if it is not already selected.
- In the monitor menu directly below, select 'in'.

We've now instructed Ableton to listen to what's happening on MIDI channel 1. If your KeyStep Pro is in its default state, Track 1 will transmit on MIDI channel 1.

Select Track 1 on the KeyStepPro and play a note on the keyboard. You should now hear the virtual instrument you dragged to Ableton track 1.

We'll repeat these steps for Ableton track 2:

- Again select KeyStep Pro as the MIDI source.
- Select MIDI channel 2 as the channel that this track should listen to and playback.
- Select 'in' to monitor directly what is coming in on this channel.

Repeat this for KeyStep Pro Tracks 3 and 4 and select MIDI channel as input for Ableton track 3 and MIDI channel 4 as the input to Ableton track 4.

Your screen should now look like this:
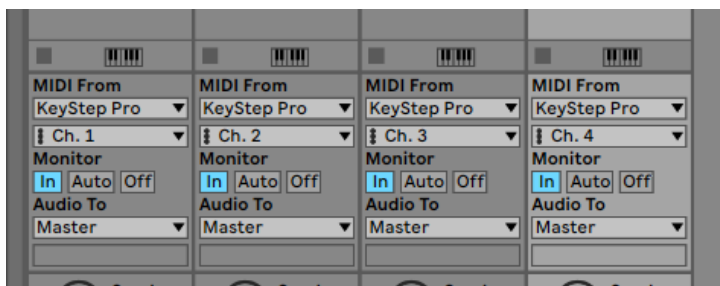
In this setup, the four KeyStep Pro tracks will play on the four corresponding Ableton tracks.

To play a drum track in Ableton:

- Drag a drum set into an Ableton track.
- Set the track to MIDI channel 10.
- On Track 1 of the KeyStep Pro, press the Drum button.

> ♪: By default, the KeyStep Pro's drum track (only available on Track 1) will always transmit on MIDI channel 10.

Because you've set the Ableton drum track to listen on MIDI channel 10, the two will match.

Your screen should now look like this:
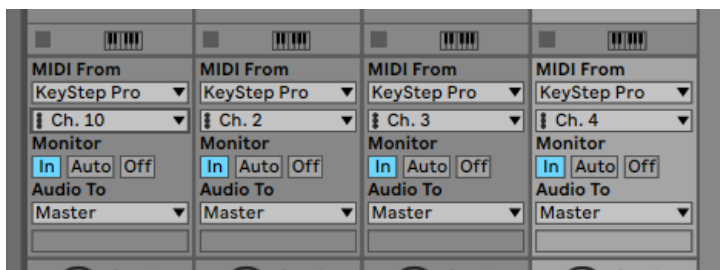
4.1.5.2. Tutorial 1: Using MIDI to Control Arturia's MINI V VST synth

In this tutorial, we will use the KeyStep Pro to control the filter cut-off frequency of Arturia's MINI V VST synth. The MINI V is part of Arturia's V Collection, a great series of software emulations of classic hardware synths.

Even if you don't own the MINI V, you can still follow this tutorial. Just download the Demo version from https://www.arturia.com/support/downloads&manuals. Although this tutorial features the MINI V, it can be used to learn how to control any knob on any VST synth from Arturia's V Collection that you want to set up to receive MIDI.

- Connect the KeyStep Pro's USB Out to your computer's USB In. Load either the standalone or the DAW-based VST version of the MINI V.

- In the MIDI V user interface, open the Arturia system menu in the top left and select 'Audio Midi Settings'. Under 'MIDI Devices', select the Arturia KeyStep Pro.

> ♪: 'MIDI Devices' is only visible when a KeyStep Pro is connected to your computer via USB.

- Next, click on the MIDI symbol in the top right of the Main Menu. The knobs on the MINI V will now be highlighted in red or purple.
- Click on the Cutoff Frequency knob in the Filter section of the MINI V. Tweak the Filter knob on the KeyStep Pro. The Cutoff Frequency knob of the MINI V should now respond to your knob movements.

4.1.6. Clock In/Out

The Clock input and output connectors on the back panel allow the KeyStep Pro to synchronize with many different clock formats: a single pulse per step, two pulses per step, 24 pulses per quarter note (ppqn), and 48 ppqn.

These options enable you to connect and stay synchronized with almost every conceivable piece of music technology.

4.1.6.1. Clock In/Out Rates

The downloadable MIDI Control Center can also be used to configure the KeyStep Pro to send and receive one of the following clock signals via the Clock In and Clock Out connectors.

4.1.6.2. Clock In/Out Connectors

Over the past few decades, several types of connectors have been used for musical synchronization purposes. Here's a table that indicates the best kinds to use when connecting older devices to KeyStep Pro:

Connector type	Signal(s) sent
1/8" mono (TS) [1]	Clock pulse only [1]
1/8" stereo (TRS) [2]	Clock pulse and start/stop [2]
1/8" stereo (TRS) plus DIN sync adapter [2]	Clock pulse and start/stop [2]

You can use the supplied 3.5 mm jack to 5-pin DIN adapters to connect to devices which utilize DIN sync messages. Check the owner's manual for your device if you are not sure which sort of sync capabilities it has.

1. If Sync is set to an external source and a TS connector is used, the sequencer needs to be armed before it can start when receiving a clock signal. You must press the Play button to arm the sequencer. For example:
2. If the Play button has been pressed but no clock signal has been received, the unit will wait for a clock signal and only start when it receives one.

- If clock signals are being received but Play is not active, the unit will start as soon as you press the Play button.
- If Sync is set to an external source and a TRS connector is used, the Keystep Pro will follow the master and will:
- Play on receiving a high-state signal and clock,
- Pause on receiving a high-state signal and no clock, or
- Stop on receiving a low-state signal, with or without clock.

4.1.7. Master or Slave

KeyStep Pro can be the clock master for an entire MIDI rig, or it can just as happily serve as a slave to several clock sources. Clock In and Clock Out can synchronize with older clock types such as 2, 24 or 48 ppqn (pulses per quarter note), or even a single pulse per step.

Whether the KeyStep Pro will send or receive MIDI Clock signals and send or receive Transport Signals (Start-Stop-Continue) will depend on the corresponding settings in Utility>MIDI Settings.

> ♪: While the unit is playing a sequence, the Sync settings cannot be changed.

4.1.7.1. KeyStep Pro as Master

To use the KeyStep Pro as clock master, in Utility>MIDI Setting>Clock send must be on. This is the default setting.

You can set the Master sync options in Utility>Sync>Output. To access the utility menu, hold down SHIFT and press the Project button.

Category	Parameter	Description	Utility	MCC
*Sync *				
	Output: 1 PP16, 2 PPQ8, 1 PPQ, 1PP2Q, 1 PPQ4Q, Korg, 24PPQ, 48PPQ	Allows KeyStep Pro to sync with various clock types	x	x

In this menu, you select how the KeyStep Pro will control the tempo of external modules or synths.

- The transport section will control the internal sequencers.
- MIDI clock messages are sent to MIDI Out 1, MIDI Out 2, USB Out and Clock Out.
- The sequence tempo can be set using the Tempo encoder and the Tap Tempo/ Metronome button.

4.1.7.2. KeyStep Pro as Slave

The KeyStep Pro can function as a slave to an external clock source. To use the KeyStep Pro as a slave, in Utility>MIDI Setting>Clock receive must be on. This is the default setting.

You can set the Slave sync options in Utility>Sync>Input. To access the utility menu, hold down SHIFT and press the Project button.

Category	Parameter	Description	Utility	MCC
*Sync *				
	Input: Internal, USB, MIDI, 1 PP16, 2 PPQ, 24PPQ, 48PPQ, Auto	Defines tempo source of KeyStep Pro	x	x

In this menu, you select how the KeyStep Pro will follow the tempo of external modules or synths.

When the KeyStep Pro is in Slave mode:

- The Tempo controls will not control the internal sequencer while the external clock source is running.
- The KeyStep Pro transport section will perform as usual: you can stop, start and pause the internal sequences, and you can record patterns.
- When the external clock source is not running, the KeyStep Pro will function according to its internal clock at the last set tempo.
- The KeyStep Pro will pass the synchronization messages it receives from the external clock source to USB Out, MIDI Out 1. MIDI Out 2 and Clock Out.

4.2. Front Panel Overview
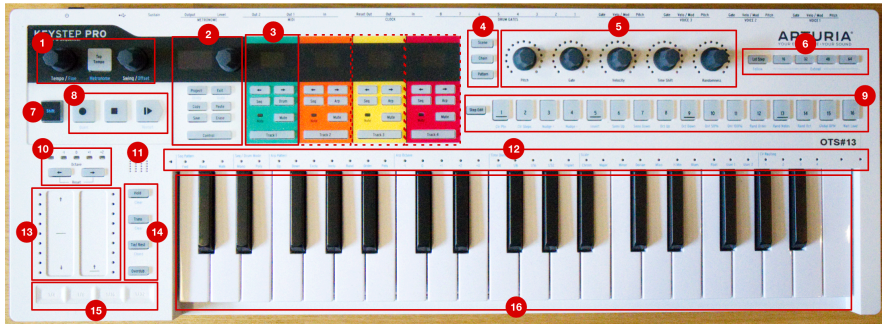
1. Tempo Section
2. Control Section
3. Track Sections (4x)
4. Scene/Chain/Pattern Buttons
5. Main encoders (5x)
6. Sequence Length Section
7. SHIFT button
8. Transport Controls
9. Step Buttons
10. Keyboard Transpose Section
11. Built-in Metronome Speaker
12. Keyboard LEDs and SHIFT Functions
13. Pitch / Mod touch strips
14. Keyboard and Sequencer buttons
15. Looper
16. Keyboard

4.2.1. Tempo Section

Here you can find the tempo-related controls of KeyStep Pro. When KeyStep Pro is internally synchronized, your settings here will affect the internal sequencers/arpeggiators and any external equipment connected to KeyStep Pro.

The Tempo/Fine knob sets the tempo from 30-240 beats per minute (BPM). As you turn this knob, the BPM value is automatically rounded off to the nearest whole number and shown on the KeyStep Pro's OLED display. Holding down SHIFT while turning this knob gives you finer BPM control by switching off the whole-number rounding.

The Tap Tempo/Metronome button lets you set the tempo by tapping on this button in time with the beat you want or are hearing.

To enable or disable KeyStep Pro's built-in Metronome, hold down SHIFT while pressing the Tap Tempo/Metronome button.

Turning the Swing/Offset knob lets you adjust the amount of swing or 'shuffle' feel in your sequences. It affects either the entire project (all four tracks at once) or only the selected sequencer/arpeggiator, leaving the others unchanged. Holding down the SHIFT button while turning the Swing/Offset knob lets you adjust the timing offset for a track

> ♪: If the KeyStep Pro is externally synchronized, the master tempo will be determined by an external clock source and the Tempo/Fine knob and the Tap Tempo button will be ignored.

Swing introduces a shuffle feel to the active sequence or arpeggio. If you've listened to a variety of musical genres (it's unlikely that you haven't) you have heard swing. It's when musicians play just before or just after the beat. This is very often heard in jazz and Latin American music. It evokes a feeling of freedom, of not being forced into a fixed, grid-like rhythm. It is particularly effective when you mix 'straight' notes with 'swung' notes.

25 different settings are available, ranging from fully counter-clockwise (no swing, or 50%) through increasing amounts of swing (51-74%) to fully clockwise (maximum swing, or 75%).

What the Swing setting does is shift the timing of the notes in a sequence, making the first note of a pair longer and the second note shorter. Assuming the time division is set to 1/8, here's what will happen: with Swing set to 50%, each note gets equal time, resulting in a 'straight 1/ 8th note' feel.

As the Swing value is increased above 50% the first 1/8th note is held longer and the second is played later and shorter. You'll notice that the sequence starts to 'shuffle' a bit and hopefully sounds less mechanical to your ear.

The maximum Swing setting is 75%, at which point the 1/8th notes sound more like a 1/16th-note figure than 'shuffled' 1/8th notes.

> ♪: Each sequence can have its own Swing setting.

The Swing/Offset knob has a secondary function: to set a track offset. Holding down SHIFT and tweaking Swing/Offset will apply an offset to the selected track.

Turning or pressing the Swing/Offset knob will display the global and current track offset values.

4.2.2. Transport Section

The three Transport buttons control the sequencers, the arpeggiators and any external MIDI devices by using MIDI Machine Control (MMC). If your DAW does not respond to MMC commands, the Transport buttons can be configured to send other MIDI messages . Please refer to the MIDI Control Center [p.124] to make changes if needed.

♪: In sequencer mode, all three Transport buttons are active. In arpeggiator mode, only Play/Pause and Stop are active.

4.2.2.1. All Notes Off

The Stop button has an additional function. If for some reason you end up with a stuck note playing, just press the Stop button quickly three times in a row. The KeyStep Pro will then send an All Notes Off command via MIDI.

4.2.3. Built-in Metronome Speaker

The Metronome speaker plays the output of KeyStep Pro's built-in metronome. The Metronome Level knob on the back panel sets the speaker volume. The metronome can be switched on or off by holding down SHIFT while pressing the Tap Tempo button.

Read Chapter 7 [p.104] to learn more about the Metronome and synchronization in general.

4.2.4. SHIFT Button

The SHIFT button gives access to secondary functions, all of which are printed in blue on the front panel. Most of them are printed above the keys of the keyboard or below the step buttons.

All of these functions are accessed by holding down the SHIFT button and pressing another button that has blue text below it or a key of the keyboard that has blue text above it. For a detailed overview of the SHIFT functions, refer to the SHIFT function overview later in this chapter.

4.2.5. Control Section

In the control section, you'll find Project options, pattern edit options and the Utility menu.

4.2.5.1. Utility Menu

The KeyStep Pro has many internal settings that you may want to adjust. The Utility menu is where you set and change most of the global settings for the KeyStep Pro. 'Global' means that these setting are shared by all projects. They will be saved as soon as you exit the Utility menu, which you access by holding down SHIFT and pressing the Project/Utility button. The Utility menu will open in the OLED display. To navigate in the Utility menu turn the Control section encoder and click it to enter a submenu. To back up in a submenu press the Exit button. To leave the Utility menu, press the Exit button repeatedly. You don't have to save the changes you make here; they are automatically saved whenever you exit the Utility menu.

4.2.5.2. Exit/Undo

Undo is a SHIFT function closely related to the other edit functions such as copy/paste and erase. If you make a mistake during editing, it's good to know that you can undo the last change you made. If undo is possible, the Exit/Undo button blinks. Pressing SHIFT + Exit will undo the mistake.

4.2.5.3. Project Button

KeyStep Pro sequences are organized into Projects. In a Project, you save all your sequence and drum patterns. Each of the four tracks can store 16 sequences, which can be copied from one track to another. The Erase button enables you to delete entire projects (as well as patterns, scenes, steps and notes). The patterns in a project can be chained. This is a handy feature that will help you to prepare for a performance. Please refer to Chapter 6 [p.90] for an in-depth overview of these functions.

4.2.5.4. Control Mode

The Control button changes the function of the five main encoders. Instead of controlling pitch, gate, velocity, etc. and the corresponding control voltages (CV) sent to the analog outputs, in Control Mode they send MIDI control change (CC#) messages, enabling you to control parameters of external hardware synths or Eurorack modules and, for example, virtual instruments on your computer.

You enter Control Mode by pressing the Control button. When Control Mode is selected, the five main encoders send CC# values. For an in-depth explanation of what CC# values are and what you can use them for, please refer to Chapter 8. The CC# messages to be sent can be edited using the OLED display in Utility>Controller and in the downloadable MIDI Control Center.

4.2.6. Track Sections (4x)

The KeyStep Pro has four separate tracks, each of which has its own dedicated set of buttons to give you instant control over important features.
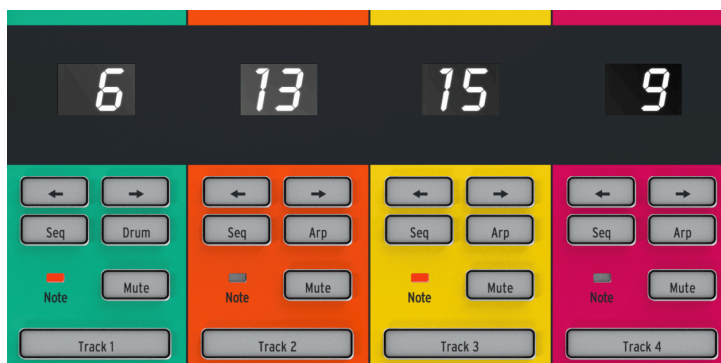
The track controls are identical except for one button: Track 1 has a Drum button for the drum sequencer, but Tracks 2, 3 and 4 each have an Arp button for the arpeggiators. The track controls function as follows:

4.2.6.1. Track Selector

The Track Selector buttons (Track 1, Track 2, Track 3 or Track 4) let you select the currently active track. The buttons of the active track light up, and the various controls of the KeyStep Pro (keyboard, encoder knobs, step buttons, etc.) will only affect the currently selected track.

As you work with the KeyStep Pro, you will notice that there is a consistent colour-coding across the entire front panel. For example, Track 1 is green and when it is selected, all of the Step Buttons and Keyboard LEDs will light up in green. Track 2 is orange and selecting it will cause the Step Buttons and Keyboard LEDs to light up in orange. These colour cues help you to know what you are editing and to avoid accidentally changing parameters on the wrong track.

4.2.6.2. Mute Button

The Mute button engages or disengages the track mute function. When this button is illuminated, its associated track is muted and does not transmit any data. In other words, devices connected via MIDI, CV or USB will not receive any signals when mute is engaged.

Holding down SHIFT while pressing the Mute button will engage or disengage Solo mode. This feature is similar to the 'solo' button found on many mixing boards. When Solo mode is engaged, the Mute button lights up in blue and you will *only* hear the soloed track (or tracks). Note that the Mute button will only mute the sequences and arpeggios that are running, possibly including a drum sequence on Track 1. You can still have a muted channel active and play its sounds on the keyboard.

♪: The Mute and Solo functions can be useful in both composing and performing contexts. For example, while composing or mixing you may need to solo a certain track to focus on it without distraction; in a performance context, you may want to mute and unmute sections to build up or breakdown a song.

4.2.6.3. Note LED

This LED lights up whenever a track's sequencer or arpeggiator is playing and/or whenever you are playing notes on the keyboard. This handy feature instantly lets you know what is happening on all four of your tracks without you having to select a track and look at its Step Buttons or Keyboard LEDs.

4.2.6.4. Sequencer and Arpeggiator Buttons

The KeyStep Pro has four tracks, each with its own independent sequencer or arpeggiator.

	Sequencer	Arpeggiator	Drum trigger (gates) sequencer
Track 1	Yes	No	Yes
Track 2	Yes	Yes	No
Track 3	Yes	Yes	No
Track 4	Yes	Yes	No

Each track has a pair of buttons labelled Seq and Arp (or Seq and Drum on Track 1). These buttons let you set the functions for their associated track. The currently selected option is lit up, and only one mode (Seq or Arp) can be active at any time.

4.2.6.5. Sequencer

The Sequencer lets you record 16 different sequences, each with up to 64 steps. You can create these sequences by playing them on the keyboard or by entering note events directly (complete with pitch, gate length, velocity and other parameters) using the Step buttons. These sequences can then be played, transposed and modified in many creative ways.

The Sequencer is covered in detail in Chapter 5 [p.51] of this guide.

4.2.6.6. Arpeggiator

The arpeggiator generates notes based on the keys of the keyboard that you have pressed or are now pressing and plays them back according to the Arp Mode setting. This is a fun and interesting way to create new patterns and melodies or to improvise on existing chords.

The Arpeggiator is covered in detail in Chapter 5 [p.51] of this guide.

4.2.6.7. Drum Trigger Sequencer

This is a special drum or 'trigger' sequencer that sends signals to the Drum Gates outputs on the back panel of the KeyStep Pro. The Drum sequencer has eight gate outputs (labelled 'Drum Gates 1-8'). You can use these outputs to trigger connected drum machines or synthesizer modules with gate (or 'trigger') signals.

The Drum Gate sequencer is covered in detail in Chapter 5 [p.51] of this guide.

4.2.7. Arrangement Section

Patterns are the basic elements for creating chains. A chain is a pre-programmed series of patterns that you construct for a performance; its an automated way of selecting patterns.

> ♪: A pattern chain can contain up to 16 patterns.

Scenes are snapshots of an interesting combination of active elements: for example, an arpeggio running on Track 1 plus sequences running on Tracks 2 and 3 with nudged and/or inverted patterns. Anything worth saving can be stored in a scene.

Please refer to Chapter 6 [p.90] for detailed information on patterns, chains and scenes.

4.2.8. The Step Edit Button

The Step Edit button enables you to edit an individual step of a sequence. By pressing the Step Edit button you active Step Edit mode.

In Step Edit mode you can use the five main encoders to edit the Pitch, Gate, Velocity, Time Shift and/or Randomness of the note or notes in the active step. There's much to discover and learn about how this seemingly simple button works. Please refer to Chapter 5 [p.51] for details.

4.2.9. Step Buttons

These 16 buttons let you activate or deactivate steps in a sequence and program specific steps. They provide visual feedback (active steps are lit up in the colour of the selected track) and an indication of the currently playing step (which is lit up in white). This is an intuitive way of programming steps that will be very familiar to anyone who has worked with an old-school drum machine.

On the KeyStep Pro, these 16 Step buttons can do many other things that just active or deactivate steps. For example, holding down the Lst Step (Last Step) button while pressing one of the Step buttons lets you set the sequence's length. Holding down the SHIFT button lets you do several different things, including clearing patterns, nudging notes backward or forward and quantizing sequences. These various SHIFT functions are covered in detail in Chapter 5 [p.51] of this guide.

One of the most distinctive features of these Step buttons is that they are colour-coded to match the track that is currently selected. So when Track 1 is active the Step buttons light up in green; for Track 2 they become orange, and so on. This colour-coding is consistently followed across the entire front panel and lets you know what track you are currently editing in the KeyStep Pro.

4.2.10. The Main Encoders (5x)

The five main encoders (above Step buttons 2 to 10) are key to changing the parameters of your patterns. They are somewhat different to standard encoders. Turn them slowly and you'll notice that they have a slight 'detent': you'll feel a small click or series of clicks whenever you move one.

Each of the five main encoders is surrounded by 15 red LEDs, each of which has eight levels of brightness from dim red to bright red. If we take the Gate encoder as an example: first turn it all the way counter-clockwise, then turn it slowly to the right. The LED in the first position will slowly increase in brightness and after eight clicks the second LED will light up dimly and the dim-to-bright cycle will repeat. All in all, this gives you 128 distinct positions for each of these encoders!

> ♪: The encoders are touch-sensitive: the moment you touch them, their current value will be displayed in the OLED screen.

4.2.10.1. The Pitch Encoder

In Step Edit mode, the Pitch encoder will step through the pitches chromatically, or if you have selected a scale by holding down the SHIFT button and pressing the appropriate Scale key it will only step through the notes that belong to the scale you've selected.

4.2.10.2. The Gate Encoder

In Step Edit mode the Gate encoder enables you to set the gate length of the selected step. Simply stated, the gate length is the ON time or duration of a note. It's a great feature: imagine how a fast 12-step piano sequence sounds when steps 3, 6, 9 and 11 are sustained, while the other steps are all short. This is something that only a very skilled pianist can accomplish. In Arpeggio (Arp) mode, the Gate encoder functions as a global encoder that simultaneously affects all gates in the currently activated arpeggio.

4.2.10.3. The Velocity Encoder

Velocity means the strength or force with which you hit a key. In the MIDI specification, velocity values range from 0-127, where notes with a velocity of 0 to 50 or so are soft, velocities of about 50 to 100 are medium, and a velocity above 100 is loud. In Utility>MIDI Settings>Velocity Curve and the downloadable MIDI Control Center you can choose a suitable velocity scaling.

In Arpeggio (Arp) mode, the Velocity encoder functions as a global encoder that simultaneously affects all velocities in your arpeggio.

4.2.10.4. The Time Shift Encoder

This encoder enables you to shift a selected note backward or forward in time relative to the centre of that step. The range is -49% to +50% of a step. In the case of two adjacent steps in a sequence, if you shift the first forward and the second backward they will seem to almost merge. In Arpeggio (Arp) mode, the Time Shift encoder shifts the entire arpeggio that is playing in the current track backward or forward in time. Of course, you'll only notice this if you have two arpeggios running simultaneously on two tracks, both on Hold.

4.2.10.5. The Randomness Encoder

In Step Edit mode, the Randomness encoder lets you choose, for each note, the probability that it will trigger, from 0% to 100%. If there is more than one note stored in the selected step, each note will trigger randomly according to the current Randomness setting.

In Arpeggio (Arp) mode, the Randomness encoder does something quite different: it introduces random notes into your arpeggio.

4.2.10.6. Setting a Track's Default Parameters

To set the parameters for a specific track, select the track using the Track 1, 2, 3 or 4 button and then turn the main encoders without holding down any Step buttons. This combination of five encoder positions will become the default parameters for that track.

4.2.10.7. Setting an individual step

To set parameters for a specific step, first choose the track you would like to edit using the Track 1, 2, 3 or 4 button, then hold down a Step button while adjusting one or more of the main encoders. Doing this will set specific values for that step that are different to the default parameters (as described above).

4.2.11. Keyboard Section

In this sub-section, we'll have a look at everything to the left of and directly above the keyboard; the lower half of the KeyStep Pro. The Keyboard has 37 velocity-sensitive keys that generate aftertouch signals. 'Velocity-sensitive' means that each key detects the force/speed with which you press it. The magnitude of aftertouch depends on how hard you press a key down after it has reached the bottom of its travel.

4.2.11.1. Pitchbend / Mod Touch Strips

These innovative touch-sensitive vertical strips take the place of the standard 'wheels' you usually find on a MIDI controller and are used to add expressivity to your performance. Each strip has a corresponding ladder of nine red LEDS to indicate the position of the control. Like most traditional wheel controllers, the Pitch touch strip is 'spring-loaded', meaning that it returns to its center value immediately when released, whereas the Mod touch strip retains its current value when released.
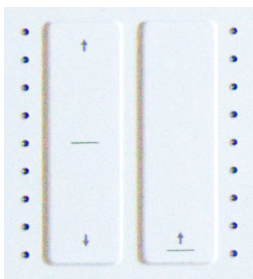
> ♪: The KeyStep Pro will remember the last position of the Mod strip of the currently selected track when you switch to another track. In a sense, you therefore have four modulation strips, one for each track!

The Pitchbend Strip

Pitch-bending is a technique whereby you bend the pitch of the currently playing note upward or downward.

The Pitchbend strip is where you perform all your pitch-bending tricks. The middle of the strip, indicated by a horizontal black stripe, is the neutral point; if you touch the strip there nothing will happen. If you move your finger up (away from you) or down (toward you), you will hear the pitch of the currently playing note go up and down. So far it's not much different to bending with a wheel. Unlike a wheel, however, you can place your finger directly on any other point of the strip. The pitch will then jump instantly to that value!

Tip: To the left of the Pitchbend strip you'll see nine red LEDs. They will help you to create more accurate pitchbends.

By default, the bend range is set to 24 semitones (half steps): 12 from the center up and 12 from the center down. In Utility>CV Settings>Pitch Bend Range, you can set the range for the Pitch CV outs from +/-1 to +/- 24 semitones.

Tapping the Pitchbend strip at two different points in succession enables you to alternate quickly between two pitches. This playing technique is only possible on pitchbend strips and makes a pitch wheel look primitive! Whenever you lift your finger off the strip, the pitch will jump back to the zero centre value. Another advantage of this strip is that it is ideal for applying natural-sounding vibrato to a note by wiggling your finger on the strip.

Tip: Musical traditions other than western classical music have much richer expressive possibilities when it comes to pitch-bending. Try listening to some Indian music. Maybe you'll come to appreciate the complex and very musical pitch-bending techniques used by singers and by performers on instruments like the sarod and the sitar.

The Mod Strip

This innovative modulation control takes the place of the standard mod wheel. It transmits the standard MIDI CC# modulation value. To learn more about CC# values, please refer to Chapter 10.

4.2.11.2. The Octave Buttons

Use the Octave arrow buttons (above the touch strips) to transpose the output of the keyboard up or down by octaves. The range is two octaves up and three octaves down from the default mid-point.
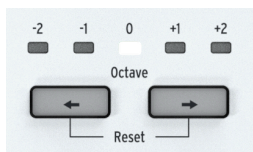
Knowing this can help you to remember where you are pitch-wise on a poorly-lit stage. The keyboard itself is three octaves but the whole pitch range is seven octaves, which should facilitate all but the most extreme musical adventures.

> ♪: To quickly reset the octave to the default mid-point, hold down both Octave arrow buttons simultaneously.

4.2.11.3. The Hold Button

The Hold button has an important function when an arpeggio is playing. When Hold is active you can lift your fingers from the keyboard and the arpeggio will continue to play. Hold also enables you to add more notes (up to 16) to an arpeggio while it is running.

4.2.11.4. The Trans (Transpose) Button

The Transpose function lets you shift up or shift down the pitch of running sequences/ patterns and arpeggios. To transpose, hold down the Trans button and play a note on the keyboard. Notes below middle C will cause a downward transposition; notes above middle C will cause an upward transposition.

4.2.11.5. The Tie/Rest/Chord Button

When creating a sequence, this button is used to enter rests or to tie two notes together. However, when in Step Edit mode, if you press Tie/Rest the current step will be cleared. If the sequencer is running in Step Edit mode, holding down Tie/Rest is a quick way to clear the contents of a series of steps.

Holding down SHIFT while pressing the Tie/Rest/Chord button switches Chord mode on or off. This is covered in .

4.2.11.6. The Overdub Button

The Overdub button plays an important role in Step Edit mode when you are editing the content of a specific step. While overdub is ON, any notes you play on the keyboard will be added to the existing notes of that step. When overdub is OFF, any new notes you play will replace the existing notes in the step. You can always tell whether you're in add or replace mode: if you are in Quick Edit or Step Edit mode, when the LED above a key blinks the existing notes of the step will be replaced.

4.2.12. Looper Mode

The horizontal Looper strip (under the Pitchbend and Mod vertical touch strips) enables you to alter the playback of a Project in real-time. It will generate longer or shorter loops depending on where you touch the Looper strip and when you do it.

The Looper loops all tracks simultaneously. This includes CC# values that you may have stored in the Control track.

4.2.12.1. Loop Length

The length of the loop is determined by where you place your finger on the Looper strip, 1/4 being the longest loop and 1/32 being the shortest. Changing the placement of your finger changes the size of the loop.

4.2.12.2. Loop Start Point

The start point of the loop depends on when you touch the Looper strip during playback. You can jump to a different loop position by holding your finger on the strip and then pressing one of the Step buttons. With the Looper, you can loop a range of steps in a sequence. The length of the loop is determined by the indentation you press: 1/4, 1/8, 1/16 or 1/32.

4.2.13. Keyboard

The KeyStep Pro's 37-note slim-key keyboard features great-feeling keys that are narrower than standard piano keys but still large enough to allow for maximum playability across three octaves. The keys are both velocity and aftertouch sensitive to give your performance maximum expressivity.

4.2.13.1. Keyboard LEDs

Each key of the KeyStep Pro has a corresponding multi-colour LED located directly above it. These LEDs blink to provide visual feedback on what the four sequencers/arpeggiators are playing. The colour of each LED changes to match the selected track (Track 1 is green, Track 2 is orange, Track 3 is yellow and Track 4 is red).

Also, the two little triangles on either side of the keyboard light up if there is activity outside the range covered by the keyboard. This may happen when an octave transposition shifts a sequence or arpeggio outside the visible keyboard range.

4.2.13.2. Keyboard SHIFT Functions

The KeyStep Pro has many secondary or 'shift' functions that can be accessed by holding down the SHIFT button and pressing one of the keys on the keyboard. The blue text above each key indicates the SHIFT function associated with that key.

The row of LEDs above the keyboard will give a lot of information about what is going on: - When you hold down the SHIFT button, the current ON/OFF state of the SHIFT functions will be shown. - When you turn the Pitch encoder in Step Edit mode, it will show which note(s) you are editing.

4.2.14. SHIFT Functions

Many of the KeyStep Pro's most interesting functions can be accessed with the SHIFT button. It's the leftmost button on the front panel and it's black. The blue SHIFT text reveals its crafty secret: it is linked to all KeyStep Pro functions that are printed in blue on the front panel. Take a good look and you'll find many of them: in the Transport section, to the left of the keyboard, above the keys of the keyboard (except the highest C), below the 16 step buttons, and in the Sequence Extend section. That's 63 SHIFT functions in total!

4.2.14.1. Keyboard Shift Functions

In itself, the SHIFT button has a very helpful feature: if you hold it down, the currently active keyboard SHIFT functions will be displayed by lit-up LEDS. From left to right above the keyboard these are:

- Seq Pattern mode
- Seq/Drum mode (Mono or Poly)
- Arp Pattern and Arp Octave
- Time Division
- Scale
- CV routing

The HOLD/Clear Button

The HOLD/Clear button enables you to hold arpeggios, so that they continue to play until you release it. You can hold arpeggios on several tracks simultaneously. SHIFT + HOLD/Clear will release all currently held arpeggios.

The Trans/Clear Button

By holding down the Trans (Transpose) button and pressing a key on the keyboard you can transpose the running sequence to another key signature. The Transpose button is a toggle button. Once you have applied a transposition to a sequence, the transpose button will 'remember' that transpose action. If you press it once more you return to the original untransposed sequence. Thus you always have an untransposed and a transposed version of the sequence at hand, and you can toggle between them!

Transposition is linked to the currently selected track. In a live situation you can, for example, transpose Track 1, then select Track 2 and apply a transposition there as well. Holding down SHIFT and pressing Trans/Clear will clear all active transpositions simultaneously.

The Tie/Rest/Chord button

Holding down SHIFT and pressing the Tie/Rest/Chord button puts the KeyStep Pro into Chord mode. It will wait for you to play a block or legato chord. As soon as you lift your fingers off the keyboard, the chord (actually its stacked intervals) is stored in memory. If you now press a key on the keyboard, that key will become the root of the stored chord. In other words, Chord mode will use the stored stack of intervals to build the chord on this new root note. Please refer to Chapter 5 [p.51] for details.

Seq (Sequence) Pattern

To activate this shift function, hold down the SHIFT button and press the appropriate key (C, C# or D in the lower octave).

This shift function enables you to change the way the notes stored in the step buttons will play. Fwd (Forward) is the default mode. Rand (Random) plays the steps in random order. In Walk mode, the sequencer digitally 'throws a dice' to decide whether to go forward or backward at the end of each step: there's a 50% chance it will play the next step, a 25% chance it will play the current step and a 25% chance it will play the previous step. Please refer to Chapter 5 [p.51] for details.
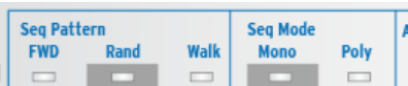
Seq/Drum Mode

To activate this shift function, hold down the SHIFT button and press the appropriate key (D# or E in the lower octave).

In Sequencer mode, each step can store a maximum of 16 notes. The mode you select here, Mono (monophonic) or Poly (polyphonic), will determine whether all notes stored in the step will play or just one: the lowest note of the stored chord.

In Drum mode, switching between Mono and Poly has a different effect. In Poly mode, each of the 24 drum tracks can have a different length. In Mono mode, they share the same length. Please refer to Chapter 5 [p.51] for details.

Arp (Arpeggio) Pattern

To activate this shift function, hold down the SHIFT button and press the appropriate key (F, F#, G, G#, A, Bb or B in the lower octave).

The KeyStep Pro can transform any chord you are holding down on the keyboard into an arpeggio. It can arpeggiate your chord in seven ways: up, down, exclusive pendulum, inclusive pendulum, random, in the order you played them or polyphonically.

There's a lot to be learned about this function, so we have devoted a whole chapter [p.51] to the wondrous secrets of arpeggiation and specifically to the KeyStep Pro's unique arpeggiation features.

Arp Octave

To activate this shift function, hold down the SHIFT button and press the appropriate key (C, C#, D, D# or E in the middle octave).

By default, the arpeggiator will play the notes you are holding down and stay within the limits of one octave. The Arp Octave -1, O, +1, +2 and +3 buttons will extend the notes beyond that range. If you change the octave range, the arpeggiator will also play notes in the octaves above and below the chord you are playing. Press SHIFT + an Arp Octave key to change the range.

Time Division

To activate this shift function, hold down the SHIFT button and press the appropriate key (F, F#, G, G# or A in the middle octave).

Time Division can be applied to both the arpeggiators and the sequencers. Much of the fun of arpeggios is that they can run at various speeds. If you mix them with sequences and change speed it will have a great overall effect. The KeyStep Pro features three arpeggiators that can run simultaneously and at different speeds!
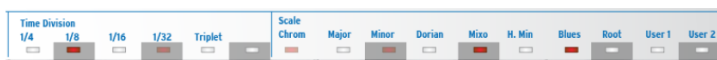
By default, an arpeggiator will run in 1/16th straight-note speed, but there are four straight-note speeds to choose from: 1/4, 1/8, 1/16 and 1/32. Each of these speeds can also run in triplet mode, so actually when you consider straight notes and triplets there are eight speed options. You can have one arpeggiator running in 1/16th straight-note speed and another in 1/8th triplets speed. There are lots of creative options to explore!

The sequencers (including the drum sequencer) can also run at these different speeds. You could, for example, run copies of the same pattern in different tracks at different speeds. There's unlimited potential for discoveries here.

Each pattern can have its own time division, which is stored with the pattern. This allows you to create chains of the same pattern in different time divisions.

> ♪: When you change to another pattern while in Arp mode, the time division will not change.

Scale

To activate this shift function, hold down the SHIFT button and press the appropriate key (Bb in the middle octave to G in the upper octave).

This SHIFT function enables you to change the scale of an arpeggio or a sequence on the fly. You can choose from six different scales (major, minor, dorian, mixolydian, harmonic minor or blues). When you select a scale by pressing SHIFT + a Scale key, everything in the currently selected track - the notes you are playing on the KeyStep Pro's keyboard, the active track's sequence and the active track's arpeggio - will play in that scale. This is a pattern setting that is stored with the pattern when you save it.

The KeyStep Pro comes with six predefined scales, but you can also create your own custom scale and store it as User 1 or User 2. Please refer to Chapter 5 for additional information.

Scale Root & User Scales

Holding down SHIFT and pressing the Root key (F in the upper octave) gives you the option to select another root note for the currently playing sequence.

Holding down SHIFT and pressing the User 1 or the User 2 key (F# or G in the upper octave) enables you to store pre-defined scale roots.

For the major, minor, dorian, mixolydian, harmonic minor and blues scales, you can select a new root note by holding down SHIFT and pressing the Root key then selecting a new root in the lower octave of the keyboard. Pressing a key in the lower octave will update the Root note. This can be repeated multiple times while holding down the Root key. The currently active root note will be shown by its LED being lit up in blue.

Please refer to Chapter 5 for an in-depth explanation of root notes and user scales.

CV Routing

To activate this shift function, hold down the SHIFT button and press the appropriate key (G#, A, Bb or B in the upper octave).

All sequencers and arpeggiators can send their output signals to the four Voice outputs on the KeyStep Pro's back panel. By default, the output of Track 1 will be sent to Voice 1, the output of Track 2 to Voice 2, etc. There may be situations where you want more control of the tracks' routings. That's what CV routing is all about. For example, you can route the output of Track 1 to all four Voice outputs, or you can route the output of Track 1 to Voices 1 and 2 and the output of Track 2 to Voices 3 and 4.

For each track, you can define any combination of voices. If a voice is already used by another track, it will be dimly lit. If it is already active for the current track it will be brightly lit. If you select a voice that is already being used by another track, you will overwrite the previously assigned voice. When Track 1 is in Drum mode, CV outputs that were assigned to Track 1 will be freed up.

CV routing is an important skill to master when you use a modular system [p.136] with your KeyStep Pro.

Clr Ptn (Clear Pattern)

For the currently active pattern, this function clears all steps, resets the sequence length to the default 16 steps and restores all other default settings: 1/16th straight-note speed, Forward seq mode, Poly mode, Chromatic scale. Clearing a Drum pattern clears all 24 drum tracks simultaneously.

Clr Steps (Clear Steps)

For the currently active pattern, Clr Steps clears all steps but keeps everything else unchanged. When applied to a Drum sequence it will clear only the selected drum track.

<Nudge

<Nudge shifts the currently active pattern to the left. All steps on all pages of the Pattern will shift to the left. It works both with sequencer patterns and drum patterns. In Drum mode it will only affect the currently selected drum track.

Nudge>

Nudge> shifts the currently active pattern to the right. All steps on all pages of the Pattern will shift to the right. It works both with sequencer patterns and drum patterns. In Drum mode it will only affect the currently selected drum track.

Invert

Invert inverts all notes currently present in the steps. The last notes in the pattern will become the first and the first the last. Invert acts on the currently active step groups.

Semi Down

This function is for intelligent semitone (half step) downward transposition of the current sequence. It's intelligent because the transpose function takes the current scale setting into account.

Semi Up

This function is for intelligent semitone (half step) upward transposition of the current sequence. Again, it's intelligent because the transpose function takes the current scale setting into account.

Oct (Octave) Down

Transposes the current pattern one octave downward.

Oct (Octave) Up

Transposes the current pattern one octave upward.

Qnt (Quantize) 50%

Sets recording quantization to 50%. When in Drum mode, it will only quantize the currently selected drum track. Please refer to the sequencer section [p.51] for details.

Qnt (Quantize) 100%

Sets recording quantization to 100%. When in Drum mode it will only quantize the currently selected drum track. Please refer to the sequencer section [p.51] for details.

Rand (Randomize) Order

Randomizes the order of the steps in the current pattern.

Rand (Randomize) Notes

Randomizes the notes (pitch values) in the current pattern.

Global BPM

Pressing SHIFT + Global BPM enables you to switch between the Global tempo set in the MIDI Control Center and the current Project Tempo. A Project Tempo is stored with a Project when you save it. When lit up (in blue) the Global tempo is active. When unlit, the Project Tempo is active.

Wait Load (Wait to Load)

This is where you 'tell' the KeyStep Pro how it should continue to the next pattern. For Patterns, the wait-to-load options can be set directly using the SHIFT button: hold down SHIFT and press Wait Load to switch instant change on or off. Whether the change will occur at the end of the current bar or at the end of the current pattern is determined by settings made in Utility or the MIDI Control Center.

It is also possible to change the wait-to-load behavior of Scenes and Projects. Should the KeyStep Pro wait for 1 bar, 2 bars or 4 bars before switching to the next Scene or Project? Changing Scene and Project behavior is done in Utility>Launch Quantize or in the MIDI Control Center. Please refer to Chapter 6 [p.90] for details.

4.2.15. The Sequence Extend Section

These five buttons and their associated SHIFT functions enable you to view and set the step groups of your pattern in great detail.

To start with, you can set the length of a pattern or sequence by holding down the Lst Step button and pressing one of the step group buttons (16, 32, 48 or 64). The maximum length is 64 steps. This works whether you are recording in Step mode or Real-time mode.

Within a page, you can further refine the pattern length by holding down the Lst Step button and pressing a step button.

Pressing SHIFT + Lst Step / Follow lets you follow the actively playing step while the sequence is playing.

In Drum mode, when Poly is activated, the individual drum tracks can have different lengths.

4.3. Back Panel Overview

1. Analog Voice outputs (4x)
2. Drum Gates outputs (8x)
3. Clock In/Out/Reset Out
4. MIDI In/Out 1/Out 2
5. Metronome Level knob and Metronome Output
6. Sustain Pedal input
7. USB, 12V DC / 1.O A power input, and ON/OFF switch

4.3.1. Pitch, Velo/Mod & Gate Outputs

For each of the four Voices, these outputs send analog control voltages (CV) and gate/trigger signals to external devices, for example Arturia's popular analog synthesizers (MiniBrute/SE, MicroBrute/SE, MatrixBrute) or a Eurorack modular system.

The Pitch CV output is mostly used to control the pitch of an external voltage-controlled oscillator (VCO).

The Velo/Mod CV output can be routed to a destination such as the cutoff frequency of a voltage-controlled filter (VCF) or the amplitude/gain of a voltage-controlled amplifier (VCA). By default, it is mapped to the keyboard velocity, but this can be changed to aftertouch or another voltage source in the Utility menu or the MIDI Control Center [p.124].

The Gate output sends gate (trigger) signals with a length determined by the Gate encoder. A long gate will cause the sustain stage of an envelope generator (EG) to remain high for a long period of time. It has selectable output ranges, so that you can adjust the output levels to accommodate different gate standards.

The KeyStep Pro has four tracks, each with its own sequencer or arpeggiator. These tracks are linked to the four Voice outputs on the back panel. Each voice has its own Pitch, Velo/Mod and Gate outputs (labelled Voice 1 to Voice 4). This powerful collection of features means that you can control up to four completely separate synthesizer voices at the same time using only your KeyStep Pro! In addition, the KeyStep Pro has powerful voice-routing options.

> ♪: Arturia's MIDI Control Center software and the Utility menu allow you to configure the type of electrical signals that are generated and sent to each output. See Chapter 9 [p.116] for more information about this topic.

For more in-depth information about the CV/Gate functions, refer to Chapter 10: Keystep Pro and your modular system [p.136].

4.3.2. Drum Gates

The KeyStep Pro's Track 1 can be configured to work as an eight-output drum-trigger sequencer by pressing the Drum button on the top panel. These are the individual gate outputs for that sequencer.

This mode is described in detail in Chapter 5 [p.51] of this guide.

> ♪: These gate signals are not limited to triggering drum sounds. You can connect these outputs to any input that accepts a trigger or gate signal, including an ADSR envelope generator or an LFO reset. Experiment, and we're sure you'll find some delightful rhythmic uses!

4.3.3. Clock Section

These three jacks (In, Out, Reset Out) allow you to interface with modular synthesizers and pre-MIDI technology that was capable of clock synchronization (such as early drum machines produced by Korg and Roland).

The KeyStep Pro is capable of both sending and receiving synchronization signals. It also has a Reset Out, allowing external sequencers with a reset input to re-start from the beginning of a sequence whenever a KeyStep Pro sequence is restarted.

Please see Chapter 7 [p.104] for information about clocking and synchronization.

4.3.4. MIDI Section

Three full-sized 5-pin DIN connectors let you send and receive MIDI data to/from external MIDI-compatible devices. The KeyStep Pro includes one MIDI input and two independent MIDI outputs to provide maximum flexibility when working with external hardware.

The KeyStep Pro can send not only MIDI note-related data but also MIDI synchronization signals, so that your external tempo-dependent devices (such as sequencers, arpeggiators, etc.) remain in sync.

> ♪: When working with a host computer, these connectors can also be used to send MIDI data from your music software to your connected hardware.

4.3.5. Metronome Section

KeyStep Pro has a convenient built-in metronome, making it easy to build up empty sequences from scratch without having to use an external rhythmic reference (such as a metronome or drum machine) as a 'click track'. The internal speaker (located on the front panel) produces clearly audible metronome ticks, so you don't need to use external speakers.

The **Level** knob sets the output level of the metronome. This knob is retractable to prevent accidental changes to the metronome volume. Press the knob to stow it away and press it again to bring it back out for adjustment.

The **Output** jack lets you send the metronome signal to a mixer or headphone distribution amplifier, so that multiple performers can play to the same metronome.

> ℹ !: The Level knob only affects the internal speaker's loudness level. It does not affect the signal sent from the Output jack.

4.3.6. Sustain Pedal Input

Connect an optional sustain pedal to this input. It is best to connect the pedal before switching on the KeyStep Pro, so that it can correctly sense the pedal's polarity. Be sure to keep your foot off the pedal when switching on the KeyStep Pro or its operation may be reversed. If this happens, switch the KeyStep Pro off and start again.

4.3.7. USB and Power Section

The KeyStep Pro is a standalone product and can be used by itself without a host computer. To do this, simply connect the included 12 V power supply adaptor to the KeyStep Pro and switch it on. To make life easier for international travellers, the 'universal' power supply adaptor (12V DC, 1.0 A, centre positive) includes interchangeable leads, enabling you to use the KeyStep Pro in most countries of Planet Earth.
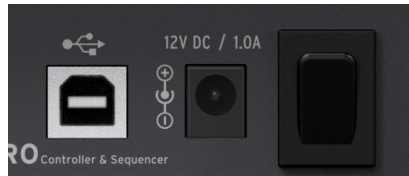
The USB connector provides both DC power from and data connections to your computer or tablet for those occasions when you want to use The KeyStep Pro with a host device. When working this way, simply connect the KeyStep Pro to your host device with the supplied USB cable and switch it on.

> ℹ️ !: If your host device cannot supply enough current, you will need to power the KeyStep Pro with the included 12V power supply adaptor. !: The KeyStep Pro can be powered with a standard USB powerbank. This allows you to use your KeyStep Pro as a standalone product in remote locations where mains power is not (always) available!

4.3.8. Kensington Lock Port

The KeyStep Pro is highly portable and easy to carry, but it should be carried away only when you want it to be, and not by a thief!

We've included a Kensington lock slot on the far right edge of the back panel so you can secure it to the surface of your choice.

5. MAKING TRACKS

In this chapter, we'll have a look at the process of creating (drum) sequences and arpeggios. What's the use of having tracks if you have nothing to fill them with?

5.1. Sequencer / Arpeggiator (or Drum) Tracks

The KeyStep Pro has four Tracks, each with its own independent Sequencer or Arpeggiator.

	Sequencer	Arpeggiator	Drum Sequencer
Track 1	Yes	No	Yes
Track 2	Yes	Yes	No
Track 3	Yes	Yes	No
Track 4	Yes	Yes	No

Each track has a pair of buttons called **Seq/Arp** (or **Seq/Drum** on Track 1). These buttons let you set the functionality for their associated track. The currently selected option is illuminated and only one mode can be active at a time.

5.2. The Three Arpeggiators

One of the unique features of the Keystep Pro is that has three (!) arpeggiators. What makes it even more unique is that these arpeggiators can run in different scales and time signatures simultaneously.

5.2.1. What is an Arpeggiator?

An Arpeggiator breaks up a chord into individual notes: hold a chord on the keyboard press play and the arpeggiator will play them back one by one. You can keep adding notes to the arpeggio, holding down more keys will add them to the arpeggio. If you happen to have 16 fingers you can use all of them to create a maximum length arpeggio. A better way to extend arpeggios is to make use of the hold key. We'll explain this in the next section

To activate the Arpeggiator, select a track with an Arpeggiator, press the Arp button to select it. It lights up in white to show it's active in Arpeggio mode. Now hold a chord and press Play to start your arpeggio.

5.2.2. HOLD and the Arpeggiator

You have some control over the patterns that are generated:

- The Arpeggio picks notes within the available octaves as defined by the Arp Octave selector; press one of the Octave keys to change the arpeggio range.

When you find a particularly interesting pattern, press the HOLD button and refrain from touching the keyboard; whatever keys you held down on the keyboard will remain active, even after you lift your fingers. The arpeggio will continue, and you'll have an extra hand to tweak knobs. As long as you keep at least one note depressed you can extend an arpeggio to a maximum length of 16 notes.

When, after lifting your fingers from the keyboard, you play a new chord this will start a new arpeggio that will replace the current arpeggio.

This feature creates some interesting creative options: when you set an arpeggio to play in the order you press the keys in the chord, you can repeatedly play the same chord in a different order, thus emphasizing other notes in the chord. If you play with your attention focussed on the velocity of the notes in the chord you can make this effect even more pronounced.

Another thing to try is to combine an arpeggio held in poly mode with an arpeggio in exclusive or inclusive mode. The 'poly' arpeggiation will repeat all notes in the arpeggio simultaneously thus forming a chorded background for the second arpeggio.

5.2.3. Editing an arpeggio

While an arpeggio is playing you edit Gate length, Velocity, Time Shift and Randomness with the five encoders. Editing Time Shift only makes sense when you have two or more Arpeggios running. Let me rephrase that; it makes a lot of sense! Instant Steve Reich/Terry Rily! Randomness will add an additional element of surprise by adding random pitch changes to your arpeggio. Used sparingly when multiple arpeggios are running will add even more depth. The edits you make will affect the currently active arpeggio only.

Press SHIFT+ (HOLD) clear to clear the arpeggio.

Note: The HOLD state is not saved with the pattern.

Note: HOLD does not work with external MIDI. If you need to hold an external MIDI note(s), send the Keystep Pro a Sustain message using a sustain pedal.

5.2.4. Arpeggiator features

The KeyStep arpeggiators have many features not found on other arpeggiators. To start with; there are three of them. Imagine the creative options at your disposal when you have three arpeggiators in hold playing simultaneously and being able to transpose them individually with a certain scale, each arpeggio running in a different scale!

When HOLD is active the arpeggio will run indefinately and you can focus on making changes to the arpeggio.

With the excepion of Pitch, all encoders can be used to edit the arpeggio. These edits are global you cannot change the indivual parameter of the arpeggio. You can however make these global edits: change the Gate time, Velocity, Time Shift and Randomness. To hear the effect of Time Shift you need to have two arpeggios on hold running simultaneously. Randomness will apply random pitch changes to the arpeggio.

5.2.4.1. Directions

Just above the keyboard, you'll find a series of icons; Up, Down, Exclu, Inclu, Rand, Order and Poly. These are used to select how the Arpeggiator will arpeggiate the chord you're playing on the keyboard.

- 'Up' will play the notes of your chord from left to right or bottom to top, depending on your point of view. The order in which you press the keys does not matter. The arpeggiator will always play the individual notes from left to right.
- 'Down' first play the highest note of your arpeggio and picks the remaining notes from right to left.
- 'Exclu' pendulum motion excluding repeat of endnote
- 'Inclu' pendulum motion including repeat of endnote

Exclu and Inclu both play your chord in a pendulum motion, from down to up and from up to down. The difference is what happens at the extreme ends of the arpeggio. Let say you have a four-note chord. In 'Exclu' mode it will be arpeggiated as 1,2,3,4,3,2,1,2 . etc. In 'Inclu' your arpeggio will be played as 1,2,3,4,4,3,2,1,1,2 . etc.

- 'Random' will play the notes of your chord in random order.
- 'Order' will play the notes of your chord in the exact order you played them. You can use this to good effect by repeatedly playing the same chord but changing the order in which your fingers touch the keyboard.
- 'Poly' will repeat the entire chord instead of arpegiatting the notes inside of the chord. The octave of the notes repeated will depend on the Arp octave parameter and will basically transpose the chord, then switch back to the current octave.

5.2.4.2. Octaves (a multi octave arpeggio)

By default the Arpeggiator will play the notes you hold down and stay within the limits of an octave. The Arp Octave keys will extend the notes beyond that range. By changing the octave range, the Arpeggiator will also play notes in the octaves above the chord you play.

Octave range settings:

Octave	Function
-1	held down notes plus the same notes repeated one octave below
0	only notes held down on the keyboard are played
+1	held down notes plus the same notes repeated one octave above
+2	held down notes plus the same notes repeated two octaves above
+3	held down notes plus the same notes repeated three octaves above

The Arpeggiator has another freaky feature that becomes apparent when you press the Octave Up or Down button (to the left of the Shift button) while playing an arpeggio. On most arpeggiators pressing the octave down or up button will transpose all currently held notes in the arpeggio an octave down or up. The Keystep Pro Arpeggiator will keep the pitch of your arpeggio intact. If you change the octave down or up the new notes you play will be added to the arpeggio in the new octave range.

When Scale mode is active this can have a peculiar effect on you arpeggio, notes that would normally be in you arpeggio will be forced in the current scale causing duplicate notes. If, for example, you've set the scale to C major and you play an arpeggio with an E and an Eb in it, which is foreign to the C major scale the arpeggio will play the E twice. Which causes a ratcheting effect.

5.2.4.3. Time divisions

The Tempo knob determines the speed of your arpeggios. Tempo changes are displayed as BPM (Beats Per Minute) in the display. The default rate is 120.0 bpm.
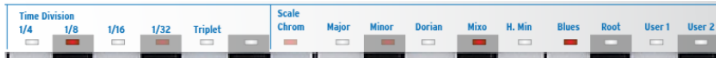
The Arpeggiator will sync to the internal clock, The Division Rate tells you how the arpeggiator is currently synced to the clock. For example, if you select 1/4 the Arpeggiator plays quarter notes (four notes per measure). It's useful to remember this because this way of syncing is the same for an arpeggio and the sequences. The available time divisions are listed below:

- 1/4 note
- 1/4 note triplet
- 1/8 note
- 1/8 note triplet
- 1/16 note
- 1/16 note triplet
- 1/32 note
- 1/32 note triplet

At this point, you will probably wonder how to create the triplet values in the above list. It's simple: to create 1/8 triplets, hold SHIFT and press the 1/8 key (F#) plus the triplet key (A)

Note: 1/4 corresponds to a standard metronome tick.

5.2.4.4. Scale and Root

When an arpeggio is running you can alter its scale on the fly. Please refer to the to the Scales [p.84] section later in the chapter for more information.

5.2.4.5. Chord Mode

The KeyStep Pro can memorize a chord. You can then play an entire chord by pressing a single key on the keyboard. The chord will transpose automatically as you play different notes.

It's a feature that gives new meaning to the word arpeggio. Chord mode enables you to create blindingly fast and intricate polyphonic scale quantized arpeggios; you'll hear arpeggios as you've never heard them before.

> **Caution:** The following procedure will erase the previous chord and make a new one.

Here's how to memorize a chord:

- Hold the SHIFT button + the Tie/Rest button. Don't let go.
- Play up to 16 notes on the keyboard. These will become your chord.
- When you are done, release the chord and the SHIFT + Tie/Rest buttons

Now the Chord button will flash once per second, which means KeyStep Pro is in Chord mode. The next key you press will play the chord you created.

You 're now ready for playing arpeggiated chords; - select an arpeggio mode - hold a chord and - Press play

Things to try:

Select another time division to hear your chorded arpeggio at different speeds. Select another scale to quantize the notes in our arpeggio to a scale.

Unless less you have hands that can span halve the keyboard is a good idea to press 'hold' before attempting the above tips.

Here are a few more things to know about this feature:

- You can use the sustain pedal instead of the HOLD button for all Chord mode functions. (The pedal will not flash, of course. But that would be cool.)

- To enter or exit Chord mode, hold the Shift button and then tap the Tie/Rest button.

- Chord memory is not saved when KeyStep Pro is powered down, neither is your arpeggio

5.2.5. Making the most of the Arpeggiators

5.2.6. Mixing Arpeggios

Mixing arpeggio's is one of the most fun creative experiences you can have with the KeyStep Pro. Here's how to pull this off.

- Activate Track two and press Arp to select the Arpeggio mode.

- Select the minor scale (or another which more your favourite) with SHIFT + Scale/Minor

- Hold down a chord on the keyboard and press HOLD.

- Press 'Play' to start the arpeggio.

Repeat this on Tracks three and four.

If all is well you now have three arpeggios playing simultaneously.

Select one of the tracks and start experimenting with 'Semi Up' (SHIFT + Semi Up), Semi Down, Oct Down and Oct Up.

By pressing Mute you can silence one of the Arpeggios momentarily.

The real magic happens when you change the time division of one or two of the arpeggios with SHIFT + Time Division. SHIFT + Time Division will only change the time division of the active arpeggio, the others will keep running at their own pace!

Tip: An (external) delay is an arpeggiator's best friend.

5.2.7. Spicing up your Arpeggios

Use the Bend strip to change the pitch of your arpeggio.

Note: In the MIDI Control Center you can set the pitch bend range in semi tone steps.

Tip: One of the most overlooked applications of an arpeggiator is merely playing one note instead of a chord. When you set the Arpeggio to medium speed, you can create rhythms by rhythmically lifting and replacing your finger on the keyboard. You can take this idea further to create Hoketus. Hoketus is the name for a technique where you repeat one note over and over and never change its pitch, but you do change all the other parameters of the note: its timbre (LFO->Filter Cutoff), the Attack, Sustain and Decay stages of the note and its volume (keyboard pressure.

5.3. The Four Sequencers

The KeyStep Pro has four sequencers, each of which can hold 16 patterns/sequences. And as each sequence can be up to 64 steps in length you have 4096 steps to fill. Your actual sequences can be much longer because you can chain sequences together; play sequence A three times, followed by sequence B playing two times, ending with sequence C. The sequencers are polyphonic, capable of stacking up to 16 notes per step.

The KeyStep Pro thus enables you to create and carry up to 64 unique sequences wherever you go. And in spite of its small footprint, there are lots of ways to modify your sequences during a performance. We'll cover those in this chapter.

Sequences can be stored in Projects. A project is a collection of sequences that you create for a specific event, a recording session or a performance.

5.3.1. Exploring the sequencers

A sequencer will playback a series of notes, stored in steps. Each step can store a pitch value, an aftertouch/velocity value, a gate a Time Shift and a Random value. These values will be sent out over MIDI and out the Voice tracks when connected to a Modular system.

Once stored the steps are referred to as a pattern. Patterns can be modified, copied and chained together.

The 64 steps are divided into four page groups, page one holds steps 1-16, page two 17-32, page three 33-48 and page four steps 49 to 64.

5.3.1.1. Using the Transport Buttons

You control the sequencers with the three Transport buttons; Record, Stop and Play/Pause.

Each button has an additional function when creating a sequence

- SHIFT+ PLAY will restart a sequence

- SHIFT + Record will toggle between quantized and unquantized recording mode.

- Pressing Stop will clear any stuck notes.

5.3.1.2. Setting the length of the sequence

You set the length of a sequence by holding Lst Step and pressing one of the length buttons. To select a length in the middle of a page, first select the page and then the last step, with Lst Step + Step button.

SHIFT + Follow(Lst Step) enables you to follow the sequence while it's running.

You can copy the steps in a page and paste them to other pages. If for example you want to copy the the steps on page one and paste them to page 2:

- Hold Copy and press extend button 16
- Hold Paste and press extend button 32

At this stage you can paste what's in the copy buffer again and again: hold Paste+ 48 and Paste + 64 to paste these steps into pages 48 and 64. This will fill these page even when you have set sequence length to 16. To view and play these new page extends, lengthen the sequence.

In a similar way you can copy a number of steps and paste them to another page. If when pasting some of you steps do not fit on the current page they will continue on the next page. Please refer to Copy steps [p.68] later in this chapter.

5.3.1.3. Mono and Poly

In Mono mode, the sequencers will play one note per step. In Poly mode, a sequence can play up to 16 notes per step. To switch from polyphonic to mono mode hold SHIFT and press d2# (mono) or e2 (poly). You can use this as a performance feature by switching a polyphonic sequence to mono. Only the lowest note of the chord will survive. You can, of course, do this the other way around. Start monophonic and suddenly introduce chords by going to polyphonic mode.

In Drum mode, Mono mode means that all 24 tracks share the same length. In Poly mode, each track can have a separate length.

Note: When Poly is active, Last Step operations (copy, extend) only affect the currently selected track.

5.3.1.4. Directions

A sequence that runs from beginning to end repeatedly tends to bore quickly. The Keystep Pro sequencers can step in different ways; forward, random and walk. Forward is self-explanatory. In Random mode, the steps are played in random order. In walk mode it's as if the sequencer throws dice at the end of each step: there's a 50% chance it will play the next step, a 25% chance it will play the current step and a 25% chance it will play the previous step.

It's called walk mode after the way monks would walk in the middle ages during pilgrimages; two steps forward one step backwards. This is the walk of a rather uncertain monk. One question remains: how do you know whether the sequence plays the last step when you're in random or walk mode? This is sometimes important to know for instance when at the end of a sequence you want to start another sequence with the "wait to load" feature. It's the number of steps defined by Lst Step that defines this.

How you change the direction sequence? Hold SHIFT and press one of the three lowest keys on the keyboard.

5.3.1.5. Scales, Chords and the sequencer

The Keystep Pro gives you complete control over the tonality of your sequence. once you 've programmed a sequence you can change its root note and the scale it plays in.

To define a new root for your sequence hold SHIFT + Root and select a new root on the first octave of the keyboard. The currently active Root note will be shown with its LED turned on.

Note: you will only hear an effect when your sequence is already running in a scale other than chromatic.

An alternative way to define a root key is to hold SHIFT + one of the two User Scale keys. You assign a root to one these in the same as explained above. The advantage of this method is that in a performance situation you can define two root keys in advance and select them on the fly with SHIFT + User1 or SHIFT + User2.

5.3.2. Recording

5.3.2.1. Quick Record

Quick Record mode is the most basic and simple way to create sequence- or drum tracks. Quick recording work whether the sequencer is running or not.

In Keyboard/Quick Record mode both the Record button and the Step Edit buttons are off.

The steps turn into simple on/off controls for each step. To record something in a step just hold the step and play a note or a chord. As soon as you lift your fingers whatever you played is stored in the step. If you change your mind and want to store something else in that step, hold the step button again and play a new note/chord. This will overwrite the currently stored note(s).

Tip: There's a secret to know here: the notes you record into a step will use the current setting of the encoders. Change the encoder settings to add notes with different values.

At this point, you can add notes to what's already stored in the step by pressing the OVERDUB button. It will light up in Red to show overdub is active. Hold the step and press the notes on the keyboard you want to add to the chord.

To hear the result of your step programming press play to start the sequencer.

The keyboard is still available for playing on top of the running sequence. You can play it to solo over the currently playing sequence or press HOLD and add some notes that will sustain indefinitely like a bourdon.

By holding the TRANSPOSE button and pressing a key on the keyboard you can transpose the running sequence to another key. It's an intelligent transpose, it will take into account the scale that is currently active. Selecting another scale will instantly change the tonal focus of your sequence. To try this form of transposition, also called quantized transposition, hold the SHIFT key and select a scale. The scale keys start from Bb in the upper range of the keyboard.

There are two other SHIFT functions available to experiment with your sequence:

SHIFT + Time Division (1/4th, 1/8th, 1/16th, 1/32th).

SHIFT + MONO which leaves only the lowest note of the chords (the fundamental) in your steps. Pressing SHIFT POLY will restore the chords to their former glory.

To fine-tune your sequence use the Gate, Velocity and Randomness encoders. To change the parameters of an individual step hold the step and wiggle Gate, Velocity or Randomness. Gate will lengthen the gate time, Velocity will add (surprise!) velocity and Randomness will silence random notes in your sequence.

Press the Play/Pause button again to pause the sequence, press it once more to resume playback from where you stopped.

To start something new press Clr Ptn and create a new sequence.

Note: The previous pattern, the one you erased is still in memory. Hold SHIFT + Exit/Undo to restore it. Exit/Undo will blink whenever there is something present in the undo buffer.

5.3.2.2. Step Record

The Keystep Pro can record and playback music data in step mode. Originally popular in the 1960s and '70s, step sequencers have become popular again due to the increased interest in modular synthesizers.

A step sequencer is usually *monophonic*; i.e., it will output only one note at a time. The KeyStep Pro sequencer, however, is capable of stacking up to 16 notes per sequence step.

Step Record mode is the preffered way to quickly record sequences. Unlike Quick Edit, where have to manually select the steps you want to fill Step record mode will step through the pattern, advancing automatically when you lift your fingers from the keyboard. Press RECORD to start STEP RECORD MODE. The KeyStep Pro will jump to the first step in the pattern and wait for you to enter a note or notes. Start playing and observe how the steps fill. At the end of the pattern the KeyStep Pro will loop back to the beginning and overwrite the steps that you played before.

Pressing OVERDUB will cause the KSP to momentarily halt and remain on the current step, enable you to add more notes in this step. Press OVERDUB again to make the KeyStep Pro continue.

5.3.2.3. Real-time Recording

Realtime recording will give a more fluent, natural feel to your sequence. In Realtime mode the sequencer will run at the speed you have set with the tempo knob or the Tap Tempo knob and will store whatever you play is in the step that is currently active. That makes it somewhat harder to predict in which step your keypresses will be stored. What you play will be quantized by the Keystep Pro.

Tip: When recording in realtime mode choosing a longer sequence length gives you an advantage. To set the sequence to 64 steps, hold [Lst Step] and press the 64 button.

Holding RECORD and pressing PLAY automatically puts Keystep Pro in Real-Time Recording mode. There's a small problem: it's difficult to know when you have start playing; you can't hear were the first step is. The solution: turn on the Metronome with SHIFT + Metronome. When you now press play the Metronome starts ticking. You tell what the first step is, it's accented with a higher pitch. You can set the level of the Metronome with the encoder next to the Metronome output on the back of the KeyStep Pro.

Tip: If it's not pronounced enough, change the metronome settings in the MIDI Control Center or in Utility (SHIFT>UTILITY>METRONOME) and make the first step louder.

The sequencer is now in loop mode; press a few keys and they will be added to the loop. The KeyStep Pro sequencers are polyphonic, so instead of pressing a note, pressing a chord will also enter them into the loop. Notice that everything is recorded with the velocity you play it. Notes are added to the existing sequence or they replace the existing sequence based on the status of the Overwrite button found near the Record button.

Now how do you edit the individual notes and chord you've recorded in real-time? It's simple; press the [step edit] button and the Keystep Pro will drop out op real-time mode and switch to step edit mode. You now have al the options of step edit mode at your disposal.

About Quantized recording

There's an important concept to know about recording in real-time using the keys or incoming MIDI: the notes will be quantized according to the time division you have selected.

So, for example, if 1/16 is the current time division setting, then the recorded notes will quantize forward or backwards to the nearest sixteenth note. As the pattern loops, you can replace certain notes by playing new ones within the timing range of those notes.

You can hear the effect of quantization very clearly when you first set Tempo to 30 BPM and the time-division to 1/4 with SHIFT + 1/4. Now record a pattern in real-time with lots of very quick notes.
Press SHIFT + Qnt 50% to hear how the notes start to cluster around the beats. Pressing SHIFT + Qnt 100% makes the clustering even stronger, so much that notes almost turn into chords.

Hold SHIFT + REC to deactivate quantization.

5.3.3. Editing steps

We've already explained the basics of step-editing in Chapter 3 [p.7] but there's more to learn and discover.

In more ways than one, the KeyStep Pro sequencer is more advanced than a traditional step sequencer; it lets you transpose the sequence by playing keys on the keyboard. Most early step sequencers could not do this; the pitch of each note was set with a knob or a slider. More importantly it lets edit all parameters stored in a step.

5.3.3.1. Step edit Mode

In Step edit mode, the keyboard turns into a true step editor. When a step is active/blinking, you can edit all of its parameters; turning the pitch encoder will change the pitch of the step, turning the gate encoder will lengthen the gate time. If you happen to have stored a chord in that step all pitches will move up or down and all gate lenghts will change.

You enter Step edit mode by pressing the step edit button. The Step Edit button is probably one of the most important buttons on the Keystep Pro. You use it to edit the steps of the sequence individually.

5.3.3.2. Step edit button OFF

When it's off you use it to turn steps on or off. That seems a trivial thing but it can make a big difference to the feel of your sequence.

When your sequence is running the Keystep Pro will light up the keys that active in your sequence. You can do several things now:

- Hold the Transpose button and press a key on the keyboard to transpose you sequence up or down

- Hold SHIFT + Invert to create a mirror image of your sequence and Press SHIFT + Invert once more to restore the natural order of things (;-)

- SHIFT the looping sequence as a whole to the left or the right. To shift to the right hold SHIFT and press 'Nudge>'. A note in the first position of the loop will move to the second position, a note in the last position will wrap around to the first position. 'minor. Pressing SHIFT deactivates step edit mode so we have to reactivate to be able to continue. Now select two notes from your chord and turn the pitch encoder to the right. The selected notes will move up but stay within the minor scale!

A note you add by pressing a key on the keyboard will be added to the chord.

There are a few other options we haven't explored. When you press and hold a step all properties of the notes in the active step can be edited. Gate, Velocity, Randomness; they can be edited selectively in the same as we've edited pitch in the previous example. For example to lengthen the gate of only two notes in the chord select them and turn the gate encode to the right.

In overdub mode, you can store more notes in the step you're holding down. A step can contain up to 16 notes. Changes you make to a step will always affect all notes.

5.3.3.3. Step edit button ON

When Step edit is ON selecting a step will make it blink; the step is in edit mode now and you can edit all its parameters with the encoders.

When sequencer is stopped, and Step Edit is on, pressing a Step selects it.

You can now:

- Play notes to store in the step or if the step already contains notes change the chord or note stored in the step; they will replace the existing note(s).

- Edit its parameters with the encoders.

The real magic will happen when you press OVERDUB. In step edit mode this button suddenly take on a new life; it allows you to select notes from the chord stored in the current step and edit only these selected notes.

To enable this:

- press OVERDUB (when it is not already active)

The notes store in the step will blink.

- press the notes of the chord you want to edit. They will stop blinking and light up solid. Any edits you now make with the encoders will only affect the selected notes.

The most remarkable option you have now is to add an offset to the individual notes stored in a step! When playing chords live and musician will never hit the keys of chord at excactly the same time, there will always be minute time differences between when the notes of a chords start. One musician will always hit a chord with the index first, another with the middle. You might almost call this a musicians signature. Another use for this feature is to emulate strumming a chord on a guitar or emulate a pingers picking pattern. Used in tandem with copy/paste steps as explauined in the next paragraph, you can create very intricated sequences.

When OVERDUB is on and you select a step you can select a note of the chord stored in that step and shift it forward or backwards in time with the Time Shift encoder.

NOTE: New notes you add when OVERDUB is ON will automatically be selected for editing.

Once in this mode (Step edit/OVERDUB on) you can press other steps to select subsets of chords in them.

Press OVERDUB once more to return to regular step edit mode.

5.3.4. Working with patterns

5.3.4.1. Using the Encoders

When in Seq mode the five encoders can be used to edit the parameters of the current track.

Gate

The Gate Time parameter is used to adjust the length of a note. Potential values are from 1% (short) to 99% (long), with an additional setting of TIE. These values can be set independently for each step in a pattern.

A setting of TIE will keep a Gate open through the duration of the step that follows the tied step. Multiple adjacent steps can be tied together in this way. By default, the Gate Time is set to 50% for each event.

Velocity

If a step in the pattern is too loud or soft you can edit its velocity using the Velocity encoder. Just select the step in question with the step buttons and use the encoder to change its value. Turning the encoder will choose a new value from 1-127.

The default velocity is 100.

Time Shift

The Time Shift encoder can be used to shift the timing of steps forward or backwards in relation to the beat. This can help add a more 'human' feel to your patterns. The range is -50 to +50, or half of the Time Division value.

Randomness

Randomness randomly mute notes/triggers in your sequence. It can be used to create automatic veraity in a sequence. Per step you set the chance it will play in the sequence. If you set different values for each step, every repeat will be unique.

Tip: There is a simple way to create variety in your patterns. Especially if your patterns are 32 steps or longer. It's called the step skip feature: hold a step and press the sequence page buttons in with do not want the Keystep Pro to play this step. If you have four identical patterns in each range, hold steps 8 and 16, and press 32 and 64, the 8th and the 16th step will not play in those ranges. This works in all sequencer and drum patterns.

5.3.4.2. Using the default encoder settings

We've already hinted to this in a previous paragraph; whenever you add a note to (drum)sequence, the KeyStep Pro will read the current values of the encoders and insert the new note will the gate and velocity it finds. This feature has an enormous creative potential that you will come to appreciate when you get to know your KeyStep Pro better. It's a feature that enables you to create intricate gate and velocity patterns. How?

- Set the velocity encoder to 75% and the Gate encoder to 50%
- Activate steps in the sequence where you want to create an accented feel
- Turn down the velocity encoder to 35% and the Gate encoder to 20%
- enter several steps with these values.

Play the sequence and notice how the steps with the lower velocity values sound less pronounced and softer.

This is only the beginning, by carefully exploring the effect of long and short gate values combined with high and low-velocity values you can make many musical discoveries in unknown territory.

The effect of this feature is not limited to monophonic steps, by selectively changing the individual sustain times of the notes in a chord you can let some notes in the chord sustain for several seconds and let others die quickly.

5.3.4.3. Saving your edits

It's important to understand how the Keystep Pro handles your pattern edits. When ever you work with a pattern it is kept in memory. If you would switch off the KeyStep Pro during the edit proces and restart it, your project would show up empty. To save it permanently you have to save it to make your edit permanent. There is an easy way to check which patterns need to be saved, just press SAVE. All modified andunsafed Patterns will show up in RED.

To save one pattern:

- Hold SAVE and press Pattern. Saved steps will blink in Blue steps with unsafed edits in RED
- hit the Red coloured step of the pattern you want to save.

If there is more then one pattern with unsaved changes: - Hold SAVE and press Pattern. Saved steps will blink in Blue steps with unsafed edits in RED - Keep the SAFE button depressed and press the RED buttons of the tracks you want to save. - Press EXIT to exit the SAVE process.

A shortcut to saving unsaved patterns is to press SAVE and hit the Track button to save all patterns of the active track.

Tip: As you might have already guessed, a fast way to check wheter the patterns you are working with contain unsaved changes is to Hold the SAVE button. Patterns that contain unsafed changes will light up in RED.

5.3.5. Copy, Paste & Erase (Steps)

Copy and Paste operations are the core of the creative process. Music of almost any genre consists of basic patterns and variations of them. In this section, we'll discuss copying and pasting of steps. To learn how copy/paste on pattern level refer to chapter 6 [p.90].

5.3.5.1. Copy steps

Each step in your pattern holds a lot of information about Pitch, Gate, Velocity, Time Shift and Randomness. It even stores info about whether this step should be played or skipped in this step range of the pattern. When you copy a step to a new location all of this info is copied with it. The same is true when you nudge a step.

To copy a step hold COPY and press a step or a number of steps to select it/them. The Steps you have selected for copying will light up in blue when the Copy button is pressed. The OLED will display: Step(s) Copied.

If you want you can select empty steps. When these steps will be pasted later on the space between them will be retained.

5.3.5.2. Paste steps

Once you've performed a copy operation you can repeatedly paste from the selection you made earlies during the most recent copy.

Holding Paste and pressing a step will paste the step(s) you selected during copy and paste them at that location (either in the current pattern or in another pattern) including a pattern on another track.

If you copied multiple steps,they will be pasted started from the step you press when pasting. If you copied non-adjacent steps the will be pasted with space in between them retained. If there are gaps between copied steps, there will be a gap in pasting, it will not affect the step(s) in between.

You can paste accross the bounderies of a page; if you paste 12 steps into the last position of page 16, they will appear in the first positions on page 3.

If the steps you are pasting do not fit on the current page, the notes that do not fit will extend to the next page.

The OLED will display: Step(s) Pasted

If Track 1 is in Drum Mode, and steps were copied on one drum, then they can be pasted onto another Drum Track. It is not possible to paste from Drum to Seq or from Seq to Drum.

Note: You can repeat paste as many times as you want; as long as you do not start a new copy, that will overwrite the old contents of the copy buffer.

5.3.5.3. Erase steps

In quick Erase mode, you can hold ERASE and press the steps you want to erase.

> ℹ ! Erasing steps is immediate; there is no message asking you whether you really want to erase. On step level this makes sense as the consequences of an accidental erase are not serious.

5.3.6. Copy, Paste & Erase (Pages)

There are four step groups on the KeyStep Pro: up to step 16, up to step 32, up to step 48 and up to step 64. In the text below we'll refer to these groups as pages; pages 16, 32, 48 and 64.

You can copy the steps in a page and paste them to other pages. This will work regardless of whether Step Edit is ON or OFF. If for example you want to copy the steps on page one and paste them to page 32:

- Hold Copy and press page button 16. Page 16 will blink 3 times.

- Hold Paste and press page button 32. Page 32 will blink three times to signal that the content was pasted.

You can repeat the paste and paste these steps into page 48 and 64. This will fill these page even when you have set sequence length to 16. To view and play these new page extends, lengthen the sequence.

Note: When Track 1 is in Drum Mode, and steps were copied on one drum, they can be pasted onto another Drum Track. It is not possible to paste from Drum to Seq or from Seq to Drum.

Paste always overwrites. You can paste outside the current Sequence length, but you have to extend the sequence by pressing Lst Step + Extend to view the results of your paste action.

If you hold the Paste button you can repeat a paste on multiple pages.

To erase a page hold ERASE and press the button of the page you want to erase.

5.4. The Drum Sequencer

The Drum Sequencer is a special case. It has 24 (!) parallel tracks, but unlike the sequencer tracks, a drum track can only trigger one specific drum sound. Programming a drum pattern is also different from programming a melodic sequence. In sequencer Quick mode; you hold a step and then select the notes you want to be part of the step. The drum sequencer works the other way around; you hold a key on the keyboard that triggers a certain drum sound and then select the step in which you to play that sound.

So why do we have poly and mono options for a drum track? In Poly mode each of the 24 tracks can be different in length; track 1 could be 8 beats, track 7, 9 beats and track 12, 16 beats. You guessed it, when patterns of different lengths run in parallel some very interesting polyrhythmic effects can be created. In MONO mode all tracks have the same length.

Knowing this you can do some very strange things, like creating several tracks with an unequal length. Run them until they reach a point of complete chaos and then suddenly switch to mono mode and have them all line-up.

5.4.1. DRUM vs. SEQ: a comparison

SEQ1/SEQ2/SEQ3/SEQ4 and DRUM on Track 1 look similar, but the Drum sequencer is different in many ways:

- Drum mode will record parts for up to 32 different instruments, not one.
- Each of the 32 drums has its own track, and when a track is selected the Step buttons display the pattern events for that drum. This is similar to the classic workflow of early drum machines.
- The keys of the lower eight keys on the keyboard will send Gate on/off signals to Drum Gates 1-8, as will any drum sequencer events entered by those keys. Pressing a key will select the corresponding drum track and trigger it. Octaves have no effect in Drum mode. The output from all 24 drum tracks is also sent over MIDI.
- The Pitch encoder has no effect in Drum. The other encoders can be used to edit gate, velocity, 'shift' the timing of Drum events forward or backwards in relation to the beat and add trigger randomness to a drum step.
- The Step SHIFT functions can add many interesting changes to your Drum sequence:
    - Invert will swap the Drum map as a whole!
    - Nudge left and nudge right will shift the position of drums on your drum map one position to the left or the right.
    - Random order will make a mess of you carefully created drum map
- The Drum Sequencer has a feature called Polymeter that allows each drum track to have its own length within a drum pattern. This is covered in the Drum Sequencer oververview later in this chapter.

Note: to select a drum without triggering it hold the TRACK 1 button.

Note: In Drum mode, the OVERDUB button is always inactive, in other words, you cannot overdub on a Drum track.

5.4.1.1. Polymeter

As explained in the overview chapter the Drum Sequencer can be in POLY and MONO mode. In POLY mode each track can have its own length. This feature enables you to create complex Polymeter rhythms.

5.4.1.2. Exploring polymeter

Here' s an example: What if you wanted a pattern with this crazy mixture of time signatures:

Instrument	Track 1	Track 2	Track 3	Track 4	Track 5
Time signature	3/16	1/4	5/16	3/8	4/4

Track 5 is the longest, so we'll use that as the timing reference for our discussion.

The second loop, Track 2, plays on quarter notes 1, 2, 3, and 4, and Track 5 will play on beat 1 every fout beats.

But the other instruments will continue their shorter loops: Track 1 will play its cycle of 3, Track 3 will play a cycle of 5, and Track 4 will play a cycle of 6. They will play at different times in relation to each other for quite a while.

In this example, it will be 360 bars of 4/4 time before the first bar is heard again!

5.4.2. Gates and triggers

The Keyboard, the Sequencers (and this includes the Drum sequencer) and Arpeggiator create Gates and Triggers. Gates and triggers are needed to start envelope generators on an external synth or eurorack modules. By itself, an envelope generator does nothing; it needs a trigger or a gate to get started.

It is essential to understand that gates and triggers are two different things. A trigger is a very short pulse that can be used to sync modules to each other, or in the case of the Keystep Pro, to start Envelopes. A gate is usually longer: anywhere from a few milliseconds to a few seconds.

The Keystep Pro keyboard is the primary source of gates. When your finger touches the keyboard and you hold it there for a moment, you generate a gate. When sent over MIDI or out the Voice gates this gate starts an envelope cycle and the first stage, the Attack, begins. The envelope then continues to the Decay/Release stage and the Sustain stage. It will remain in the Sustain stage for as long as your finger touches the keyboard. Lift your finger, and the level will decrease to zero. The speed of this decrease depends on the setting of the Decay/Release knob.

5.4.3. Creating Drum Patterns

For this section, we'll assume you have your KeyStep Pro in Drum mode. If you are not sure, press the DRUM button on Track 1.

5.4.3.1. Drum Quick edit mode

Quick edit is the fastest way to create and experiment with rhythmic patterns.

Here's how it works:

- Select Track 1 and Drum Mode

- Hold a key on the keyboard that contains the drum sound you want to use for this track and press the steps you want to trigger this sound.

- Repeat this with some other keys/sounds. Press play to hear your pattern.

If you watch carefully you'll see the LED above the Key tracks you have programmed light up. If a gate is happening on the track the LED will flash momentarily. If a key/track is selected for editing the LED will be permanently lit. It's an indicator that tells you that your steps will be added to the current track. New steps you add will use the current settings of the encoders: gate, velocity, time shift and randomness. Again you can use this to create accents.

- Set velocity to medium (12 o'clock position) and activate step 1 and 8.
- Set velocity to maximum and activate step 4 an 12.

Now press play and hear how 4 and 12 are accented.

To change the parameters of a step, hold the step and change the encoder settings.

Note: After selecting Drum mode the Drum sequencer is in MONO mode by default.

5.4.3.2. Real-Time Recording of a Pattern

To record a pattern, press the Record button and then press the Play button to start the pattern. If the pattern is already playing, just press the Record button. When both are lit and the unit is running, it is in Record mode. If it isn't running, check the Sync settings in Utility with SHIFT + Project. scroll down to Sync, press the selection encoder and check the Input parameter. It's best to set this to 'auto'.

Now play one or more keys. Whatever you play will be captured as a part of the pattern. You can toggle individual events on and off with the Step buttons.

You can also record using an external MIDI/USB source, but the only steps that will be recorded are ones that correspond to the current drum note mapping. For more information see the Drum Map section of the MIDI Control Center [p.124].

The active quantisation setting will have a direct effect on the result of your recording. When recording with active quantisation in a low time-division (1/4, 1/8) the beats will be forced together. Turn Quantisation off with SHIFT + (Record)Quant to preserve the irregular feel of your playing style.

5.4.3.3. Selecting a Drum

To select a Drum instrument for individual track editing, simply tap a key. When the key is lit solid that means the Drum has been selected.

To select a Drum instrument without hearing it, hold the DRUM button and press a key.

At this point, the Step buttons will display the events that exist in the pattern for this Drum. You can use the KNOBS button and the encoders to edit particular events if you like. Use the Step buttons to toggle events on and off as needed.

When using using the Drum sequencer with a DAW it may happen that the tracks of the Drum sequencer do not match the sounds of the Drum patch you select on the DAW. The DAW drums could be mapped to play starting at C3 and up. If you play C2 on the Keystep Pro keyboard there will be no sound because there is nothing to trigger. You can solve this either by remapping the drum sounds on your DAW (check the DAW manual on how to do this) or by selecting another chromating low note in Utility>DrumMap>Config>Chromatic Low Note or in the MIDI Control Center.

If you want to go all the way you can create your own mapping in Utility>DrumMap>Config>Custom. This Utility setting enable you to map each key on the KeyStep Pro to a specific drum in you DAW. The MIDI Control Center has similar options if you prefer to work from there.

Last but not least: the first eigth keys/tracks on your keyboard are mapped to the Drum Gate outputs on the back of the KeysTep Pro. These Drum Gates are intended to trigger modules on your Modular System. Please refer to Chapter 10 [p.136] for more details on how to do this.

5.4.3.4. Muting Drums

Muting and unmuting drums is an art form that takes time to master. when used skillfully it 's a great way to introduce tension. You can start with a pattern will several muted drum tracks and gradually unmute them one by one when you need the extra drive the provide. There are two ways to mute drums on the KeyStep Pro: The first is Quick mute, the second MUTE mode.

Quick MUTE

Quick mutes are temporary, useful when you have a Drum pattern running and want mute one or more drum tracks that are in the way. To mute one or more drums while creating your pattern or during a performance:

Start in DRUM mode

- Hold the MUTE button
- Press the key that corresponds to the drum or drums you would like to mute. The muted keys will light up in solid red so you can see which ones are muted.

When you mute, this mute remembered across all patterns on the Drum track. If for example you mute the Base drum on C1 in pattern one, it will also mute that base drum on pattern 2 to 32. In other words; drum muting is a global track thing. To Unmute an individual drum hold the MUTE button and press the drum track you want to unmute.

Note: When individual Drum tracks are muted the Mute button will flash. When the entire Drum sequencer is muted the Mute button will be lit solid.

DRUM MUTE mode

You can also mute drums by entering DRUM MUTE mode.

- Hold MUTE and press DRUM

Both MUTE and DRUM buttons will now flash. As long as you are in this mode all you have to do press the key of a drum track to MUTE or UNMUTE it.

To UNMUTE all muted tracks Hold SHIFT and Press DRUM

Note: To Solo the Drum sequencer hold SHIFT and press the Mute button.

5.4.3.5. Using the Encoders

When in Drum mode the five encoders can be used to edit the parameters of the current drum track.

Gate

The Gate Time parameter is used to adjust the length of a note. Potential values are from 1/64th of a step (short) to 64 steps (long). These values can be set independently for each step in a pattern.

By default, the Gate Time is set to half a step length for each event.

Velocity

If a drum event in the pattern is too loud or soft you can edit its velocity using the encoder. Just select the drum in question with the keys and then use the encoder that corresponds to that step in the sequence. Turning the encoder will choose a new value from 1-127.

The default velocity is 100.

Note: Velocity values are not transmitted to the Drum Gate outputs,they only transmit gates.

Time Shift

The Time Shift encoder can be used to shift the timing of Drum events forward or backwards in relation to the beat. This can help add a human feel to your drum patterns. The range is -50 to +50, or half of the Time Division value.

Randomness

Randomness randomly mutes notes/triggers in your sequence.

5.4.3.6. Drum Step edit mode

Step-editing a pattern

One major use for the Step buttons is to enable or disable each step in the pattern. When a Step button is lit, a note will play at the Velocity you played on the key and will keep playing for as long as you want it to (Gate time). To silence a drum note event, simply press its Step button to disable it.

The Step buttons can also be used to change the velocity of an existing note while the sequence is playing back. Here's how:

1. Select a Drum track by pressing a key
2. Hold the Step button of an existing event and press the key. The velocity value will be remembered.

Extending a pattern

To extend a drum pattern beyond the fist 16 steps, hold 'Lst Step' and press either the 32 button, the 48 button or the 64 button. To follow a drum sequence while it loops through the different step groups press SHIFT + follow.

You can view a particular set of 16 steps by selecting that particular range of the pattern with SHIFT + Extend buttons: SHIFT + 16 selects the 16 steps, SHIFT + 32, +48, +64 the other step groups.

When working with patterns longer than 16 steps there is an important feature to know. To follow the sequence in a higher step range hold SHIFT and press Shift/Follow. This takes the KeyStep Pro in- and out of Pattern Follow mode.

When this mode is active during playback, the Step Group LEDs and the Step buttons will show steps 1-16, then steps 17-32, 33-48, 49-64 then return to steps 1-16, and so on.

When Follow is active the Lst Step button is lit.

Note: It is possible to extend a pattern by copying the existing data to the end.

Note: The playback of the pattern itself is not affected when Pattern Follow mode is disabled. This only affects what you are seeing, which should make it easier to edit particular sections of the pattern.

Note: There's a sophisticated LED colour system behind the Sequence Extend system. If, for example, your sequence plays in the second group of step and you're on track one, the 32 button will light up in green. If you on track two it will light up in orange.

Set Pattern length

The default length of a pattern is 16 steps, but as mentioned before you extend this length to 64 steps.

If you'd like your pattern to be less than 16 steps long, simply hold the LST STEP button and then press the Step button that corresponds to the desired setting. If you'd like it to be longer than 16 steps, but not cover the whole length of the step group, first select the group and then select the step within the group you want to limit the length to.

An example; you want to create a pattern with a length of 34 steps: - hold 'lst Step' and press the 48 button - press 'lst Step' + step two

Editing extended step ranges

If you want to focus on steps 17-32 while editing, here's what to do:

- Disable Pattern Follow mode (hold SHIFT + Lst Step).
- Press the 32 button.

The Step buttons now show the status of steps 17-32. You can play the pattern while editing if you want; it will play all 32 steps, but the Step buttons will stay focused on steps 17-32.

Simply edit the steps as desired with the Step buttons and encoders. When you're finished you can re-enter Pattern Follow mode with SHIFT + Lst Step if you like.

5.4.3.7. Shift Key functions

When the Drum sequencer is selected the lowest 24 keys of the keyboard send note data over MIDI, including velocity.

The keys also have secondary functions which are accessed by holding SHIFT and pressing one of the keys. These combinations allow you to specify the following pattern parameters:

Playback mode

The first three buttons on the bottom row of keys are used with the SHIFT button to select the Playback mode (i.e., the playback direction).

Here's what each option does:

- **Forward**: plays pattern beats 1, 2, 3, 4 | 1, 2, 3, 4, etc.
- **Random**: plays random beats from the pattern.
- **Walk**: plays the step using the the Drunkard's Walk Algorithm : when the sequencer is on a given step, there's a 50% chance it will play the next step, 25% chance it plays the same step again, 25% chance it plays the previous step.

The default setting is Forward.

Time division

Depending on the current setting, this parameter can be a quick way to double the playback rate of your drum pattern or cut it in half. Triplet options are available, too.

> ℹ **Note**: When Keystep Pro Clock is set to 1 pulse per step, changing Drum Time Division is only available when Keystep Pro is stopped.

To set the time division, press and hold the SHIFT button and then press the key that corresponds to the timing you want:

- Quarter notes (1/4)
- Eighth notes (1/8)
- Sixteenth notes (1/16)
- Thirty-second notes (1/32)

To switch any of those time divisions into their triplet values, hold SHIFT and then press the Triplet key.

The default setting is 1/16.

5.4.3.8. Saving a Drum pattern

Saving a Drum Pattern is the same as saving Sequencer patterns:

To save one pattern:

- Hold SAVE and press Pattern. Saved steps will blink in Blue steps with unsafed edits in RED
- hit the Red coloured step of the drum pattern you want to save.

If there is more then one pattern with unsaved changes:

- Hold SAVE and press Pattern. Saved steps will blink in Blue steps with unsafed edits in RED
- Keep the SAFE button depressed and press the RED buttons of the tracks you want to save.
- Press EXIT to exit the SAVE process.

A shortcut to saving unsaved patterns is to press SAVE and hit the Track button to save all patterns of the active track.

Tip: As you might have already guessed, a fast way to check wheter the patterns you are working with contain unsaved changes is to Hold the SAVE button. Patterns that contain unsafed changes will light up in RED.

5.4.3.9. Copying a Drum pattern

You can also copy a pattern from one location within the Drum sequencer to another, even if no edits have been made. To do this, simply follow the steps described above in Saving a Drum pattern [p.79] and select a new location number instead of the original number.

5.4.3.10. Clearing a Drum pattern

To clear the triggers currently stored in a drum track hold SHIFT and press 'Clr Steps'. To Clear the entire pattern and reset all of its settings like track lengths, time divisions etc. hold SHIFT and Clr Ptn.

5.4.3.11. Making the most of Drum mode

Many of the special shift functions you would normally apply to a sequence can also be applied to drum sequences with surprising results.

Try some these:

SHIFT + Invert will create a mirror image of the triggers in your track. The last notes will be the first. Press SHIFT + Invert once more to restore the natural order of things (:-)).

Note: SHIFT + Invert will only invert the the currently selected track.

It does not stop there: you can shift the looping drum sequence as a whole to the left or the right. To shift to the right hold SHIFT and press 'Nudge>'. A note in the first position of the loop will move to the second position, a note in the last position will wrap around to the first position.

Warning: Remember to save the pattern after making an edit.

Note: The Current Track setting affects the entire Drum pattern (i.e., the individual drum tracks will be affected as a group.)

Note: The project-level swing percentage is not saved with the Scenes, Sequences, or Patterns, but it is saved with each Project.

Tip: To explore uncharted territory set the DRUM MIDI channel something other than 10 and use the DRUM track to trigger fixed MIDI notes rhythmically.

Tip: As explained in the sequencer section there a simple way to create variety in your patterns. Especially if your patterns are 32 steps or longer. It's called the step skip feature: hold a step and press the sequence range buttons in with do not want the Keystep Pro to play this step. If you have four identical patterns in each range, hold steps 8 and 16, and press 32 and 64, the 8th and the 16th step will not play in those ranges. This works in all drum patterns.

5.4.4. Rhythmic examples

5.4.4.1. An African Rhythm

Below a rhythm called Djaa Siuiri. The First two drum rhythms; Drum 1 and 2 are usually played by djembes. The third rhythm is often played by a Sangban, a medium-sized Dunum drum played in west Africa.

To convert the rhythm to the Keystep Pro you might want to read 'S' as a drum hit with maximum velocity and 's' as a drum hit with medium velocity. The same applies to 'T' and 't'.

S - right-hand slap

s - left-hand slap

T -is the right-hand tone

t - left-hand tone

m1	2	3	4	5	6	7	8	
s-t	S--	s-t	S--	s-t	s--	s-t	S--	Drum 1
s-s	StT	s-s	StT	s-s	StT	s-s	StT	Drum 2
x-x	-x-	xx-	x-x	x-x	-x-	xx-	x-x	Sangban

5.4.4.2. An Arabic rhythm

Below a very simple traditional Arabian rhythm called Maqsum. It is usually played by drum-like instrument like the Darbouka; a goblet drum made of clay, and a Riq; a high pitched handheld instrument. It has swing feeling to it because the Riq leaves the first eight note in the second beat empty:

Measure 1	Measure 2	Instrument
xTxT	xxTx	Riq
Dxxx	Dxxx	Darbuka

To Enter this rhythm in the Keystep Pro;

- select drum mode on the first track
- select a drum set on your DAW (MIDI) or external synth.
- play the lowest octave keys on the KSP to familiarize yourself with the drum sounds triggered by each key.
- We want to make an 8 step long rhythm. To create that hold 'Lst Step' and press the 8th step.
- Found a bass drum? Hold the key that plays it and select steps on which you want to hear it. To try the above rhythm select steps 1 and 4.
- Now find an instrument that is high pitched and you can use to play the Riq part.
- Hold the key of that instrument and select steps 2, 4 and 7.
- Press 'Play' to hear your rhythm.

The method we explained above is the simplest way to enter rhythms.

To check whether a drum instrument is active in your rhythm hold down its key. Steps on will light up if the instrument has active steps. If not the step remains unlit.

To deactivate a step press it once more.

Things to try:

SHIFT + Rand Order

SHIFT + Seq Pattern (random and walk)

SHIFT + Time Division (1/4, 1/8, 1/16, 1/32 and the triplet variations)

5.4.4.3. Euclidean Rhythms

There are times that you notice you're stuck in the same routine when creating rhythms; every sequence you create is 16 steps long with every fourth step active. It has become your default setting and you find it difficult to appreciate anything that sounds different. If that is the case you may want to explore Euclidean rhythms.

An Euclidian rhythm is build using three parameters: length (Step Length), density (Step Fill) and rotation (Rotation) of the sequence. The simplest example is a sequence of 16 steps with four beats. When you distribute these beats evenly over the sixteen steps, the result is a rhythm most often heard in western music; four bars of four steps each with a note on the first step of the bar. But there 's an alternative: by combining different Fills and Lengths, a great number of original rhythms can be created. Below a few examples:
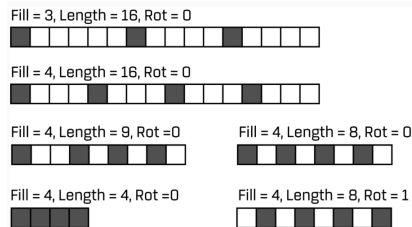
Many of these patterns are common in African and South American culture. For an in-depth explanation of euclidian rhythms and there use in various cultures, please refer to:

(http://cgm.cs.mcgill.ca/~godfried/publications/banff.pdf)

The next phase is to explore patterns, to apply pattern rotation, randomness and swing. Euclidean patterns are notated in the format E(X, Y) where Y is the length of the pattern and X the number of active steps in the pattern. For example: E(4, 7) = [× · × · × · ×] is a famous Bulgarian dance rhythm. E(2, 5) = [× · × · ·] is a rhythm found in Greece, Namibia, Rwanda and Central Africa.

Setting Pattern rotation

By shifting a pattern one position to the right with the KeyStep Pro's NUDGE function (SHIFT + NUDGE>) you change the overall character of the rhythm. If you start the above rhythm on the second step, as in [× · · × ·], it suddenly becomes a rhythm often found in Central Africa, Bulgaria, Turkey, Turkestan and Norway. Each additional NUDGE> will generate another unique rhythm.

5.5. Special features

The KeyStep Pro has many features you use to add so spice and variation to your Track. Below we'll have a look at them.

5.5.1. Scales

Scales express emotion in music. A single melodic line can evoke many emotions, but when you add chord notes from the scale of the melody to that melodic line, the feeling will become much stronger. When you add notes from the major scale, the melody sounds forceful and happy; add notes from the minor scale, and that same melodic line will suddenly seem sad. At least, that might be your response if you were born in a culture dominated by western music. In other cultures, your response to major and minor scales may be different.

A standard (chromatic) scale consist of twelve notes: C-C#-D-D#-E-F-F#-G-G#-A-A#-B. Every scale is a selection of these twelve notes.

Most scales use only 7 notes, except for the Pentatonic scale which uses 5 notes. By leaving out certain notes each scale creates a very specific emotional effect.

The most and widely used scale in western music is the C major or C IONIAN scale: play the white keys on the piano and what you hear is the C major scale. Of the twelve notes of the chromatic scale C major uses: C D E F G A B (C). Leaving out certain notes creates gaps. Some of these gaps, or in musical terms intervals, are whole-tone gaps, some halve-tone gaps. The distance from C to D is a whole tone, from E to F halve tone.
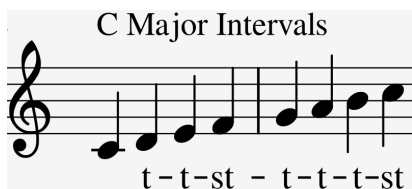
For C major this results in a specific series of intervals; tone, tone, semitone, tone, tone and semitone.

If you play the white keys on the keyboard starting at D you get a different series of intervals; tone, semitone, tone, tone, semitone, tone.
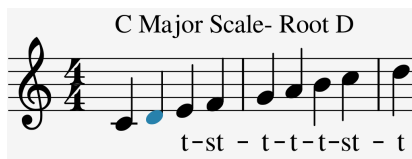
When you now start on C and play a scale using this new series of intervals you play a Dorian scale.

C Dorian Scale

When playing a C major scale starting on the fifth step, it's a Mixolydian scale.

Creating Scales in this way is an age-old trick. Scales created this way are referred to as church modes, forgotten for centuries but rediscovered by jazz musicians in the sixties. They are now widely used in western music.

5.5.1.1. Selecting Scales

If you select a scale with the SHIFT + Scale Key option everything in the currently selected track, what you play on Keystep Pro keyboard, the track sequence, the track arpeggio will play in that scale; it's a Track setting.

Note: You can use this feature to your advantage by creating Tracks with different Scale and Root settings. By muting and unmuting track, you can drastically change the tonal effect of your performance.

The Scale option works as a filter. It selects eight notes from the chromatic scale. For every scale, it's a different set of notes. In technical terms, it quantizes the default chromatic scale (C, Db, D, Eb, E, F, Gb, G, Ab, A, Bb, B) to either the:

- Major scale (C, D, E, F, G, A, B)

- Minor scale (C, D, Eb, F, G, A, Bb, B)

- Dorian scale (C, D, Eb, F, G, A, Bb)

- Mixolydian scale (C, D, E, F, G, A, Bb)

- Harmonic Minor scale (C, D, E, F, G, Ab, B)

- Blues scale (C, D, Eb, F, Gb, G, Ab, A, Bb)

To hear (and see) the effect of selecting a scale on your Keystep Pro, switch it on if it isn't on already (do you ever turn it off?) and select a preset on your external synth with a fairly simple sound.

Press SHIFT + Scale Key B to select the "Major scale". When you now play the "white" keys you'll hear the major scale. The odd thing is that the "black" keys also play the major scale. The first black key which normally plays C# now plays "C". All "black" keys are stripped of there normal pitch and have been lowered a semitone to fit in the C major scale. Whatever chord you play on the keyboard, it will always be a major chord!

Let's explore these scales. Press play to activate the Arpeggio and, starting from "C", hold down the first, third, and fifth steps of the scale; you're playing a C major chord. Press SHIFT + Scale Key to select other scales; you'll hear the third step changing when you select the Minor scale, the Dorian scale or the Blues scale

Note: A nifty trick is to start an arpeggio or sequence in a certain scale, then select another scale with the SHIFT +ScaleKey option. You'll hear you arpeggio or sequence change scale on the fly. Remember, the Keystep Pro has three arpeggiators

TIP: Use the Bend strip to change the pitch of your arpeggio.

And yes, you can transpose an arpeggio while it's playing: play an arpeggio, press hold. Now press shift and use the keyboard to transpose your arpeggio. The display will show how far up or down you are transposing.

When scale mode is active this can have a peculiar effect on your arpeggio or sequence; all notes will be forced to play in the current scale, causing duplicate notes. If for example you've set the scale to C major and you play an arpeggio with an E and an Eb in it, the Eb being foreign to the C major scale. The arpeggio will play the E twice. Which causes a ratcheting effect.

5.5.1.2. The Scale Root

SHIFT + root gives you to option to select another root note for the currently playing sequence. User1 and User2 can be used to store pre-defined scales.

For Major, Minor, Dorian, Mixolydian, Harmonic minor and Blues scales, you can select a new root note, by pressing SHIFT and holding the "Root" key and selecting a new root in the first octave the keyboard. Pressing a key will update the Root Note. This can be repeated multiple times while keeping the Root Note button key pressed. The currently active Root note will be shown with its LED turned on in Blue.

Starting a scale on a different note will drastically change the mood of that scale. If we do not start the C major scale on the 'C' but on the 'D'"instead it will sound different because the intervals are now heard in a different order.

In C major starting on 'C', it was: T-T-ST-T-T-T-ST.

When you take this interval string and start on 'D', making 'D' the Root note of the scale you get D, E, F#, G, A, B, C#, D

It's an age-old trick that was discovered and widely used in church music, rediscovered in the 8Oties and 9Oties of the previous century when the world opened up to other cultures. Jazz and other western musicians discovered the richness of Medieval church music, Indian Ragas and oriental Makams, all using scales that went far beyond the simple western Major and Minor scales.

Changing the Root note is a form of intelligent transpose, intelligent because the interval structure of the scale remains intact. This, as opposed to 'dumb' transpose that adds a halve or a whole tone to every step of the scale.

Note: If you want to know more about the fascinating subject, search "music theory" on a search engine or YouTube.

5.5.1.3. User Scales

The KeyStep Pro comes with 6 predefined scales, but if you can create your own scale and store it as user scale 1 or 2.

In the example below, we'll add Bhairavi, a well known and popular scale in Indian music. Bhairivi has lowered second- and third steps and lowered sixth and seventh steps. So it plays as C, Db, Eb, F, G, Ab, Bb, C To create this scale we have to eliminate to notes that are not part of this scale. This how you do it:

Hold SHIFT and press Scale>USER 1 (F# in the top octave of the keyboard)

Now focus on the keys in the lowest octave of the keyboard, all keys have lit up, meaning that all keys will play. We'll have to change this so that only the keys of the Bhairavi scale will play; we have to eliminate D, E, F#, A and B. Press these keys to deactivate them.

By setting a new Root for the scale you make the interval distances start at a new place on the keyboard. The interval distances of Bhairavi are 1/2, 1, 1, 1, 1/2, 1/2, 1.

If we set the root of Bhairavi to DES (which is in fact how it is often played on Indian harmoniums) the scale will be transposed to Db, D, E, F#, G#, A, Bb, C

As long as you don't make any changes to USER scale to it will act as a second chromatic key option.

5.5.2. Chord mode

The KeyStep Pro can memorize a chord. You can then play an entire chord by pressing a single key on the keyboard. The chord will transpose automatically as you play different notes.

Chord Mode lets you experiment with chord transpositions in new ways. It's a unique new Keystep Pro feature. When in chord mode you play a chord of up to four notes on the keyboard, the KeyStep Pro will switch to chord mode. It will remember the interval structure of chord you played when initiating Chord mode and allow you to play this chord with just one key. And if that is not enough it will do so in an intelligent way taking into account the current scale and the current Root note.

Chords are derived from scales. The most common chords consist of the first the third, the fifth and the seventh step of a scale. The first note of a chord is the Root. The third note in a scale determines the feel of a chord; if it is three half-steps removed from the root, the chord is minor. Four half-steps removed from the root makes it a major chord. When you add more notes to a chord, you are essentially fine-tuning and shaping the minor and major feel further. When you initiate Chord mode and play some notes on the keyboard the KeyStep Pro will analyze the interval structure of the chord you play. When next you play a note on the keyboard it will reconstruct that interval structure. If it was a minor seventh chord CM will create a minor seventh chord starting from the key you press.

It's a feature that gives new meaning to the word arpeggio. Chord mode enables you to create blindingly fast and intricate polyphonic scale quantized arpeggios.

5.5.2.1. Memorizing a chord

Memorizing a chord is very easy; just hold a chord, quickly press TIE/REST while holding SHIFT. As long as you hold either SHIFT of TIE/REST after this, you can add notes to the chord. When you let go of both TIE/REST and SHIFT the KeyStep Pro will switch to chord mode and the TIE/REST button will flash once per second. The next key you press will play the chord you created in the currently active scale.

The lowest note you entered will be the center key for transposition. Any key higher than that will transpose the chord up; any key below it will transpose the chord downward.

Here are a few more things to know about this feature:

- You can use the sustain pedal instead of the TIE/REST button for all Chord mode functions. (The pedal will not flash of course, but that would be cool.)
- Chord mode is an arpeggiator and keyboard thing, it doesn't work when playing a sequence. When chord mode is active and you record a sequence hoping that the sequence will play the chords, you'll be disappointed. You can however play a sequence and play the keyboard in Chord mode on top of it.
- Chord mode can be used when playing on the keys, EXCEPT on Track 1 when the Drum mode is selected.
- You can memorize one chord per track

Another extraordinary thing about Chord mode is that you can you hold down several keys and each key will be the starting point of a chord! This will work until you have exhausted the maximum number of voices.

To give an example: you create a C major chord (C, E, G) and the Scale setting is Chromatic

When playing this chord in chord mode and press C3 it will play C3, E3, G3. When you also hold down F3, it will add F3, A3, C4 to the chord.

To exit Chord mode, hold the SHIFT button and then tap the TIE/REST button. The last chord you stored will still be there; pressing SHIFT + TIE/REST will reenable Chord Mode with your stored chord intact.

Note: Chord memory is not saved when KeyStep Pro is powered down.

5.5.3. Using Sync

Of all the skills you can master in music, mastering sync is one of the most important. Sync is what happens when two or more units (effects, oscillators, filters, voices) synchronize their rhythms to each other. Sync is also how we humans link to the flow of music. If you want to capture the attention of your listeners you have to understand how to make captivating sync patterns.

The KeyStep Pro can sync to your DAW or external synth in different ways: changing the Time Division allows you to sync proportionally; at double speed, at half-speed, or even slower than that.

The KeyStep Pro can also sync to your Modular system; the clock-in jack on the rear panel accepts clock signals that sync the Keystep Pro to the clock of your Eurorack system, be it a sequencer and LFO or a dedicated Clock module. But there's more; a very interesting application is to connect a burst module to clock-in. Burst modules generate a flurry of clock signals that speed up and slow down. Connected to the clock input it will slow down or speed up all running (drum)sequences and arpeggios on your Keystep Pro simultaneously!

6. WHAT IS A PROJECT?

Projects enable you to store and recall 16 patterns per sequence as well as the state of each sequencer. When you do a SAVE, everything in the project is stored: ARP or SEQ mode, Mutes, Solos, Scenes, Chains, Output Mappings and current Time Divisions.

The edit options are very flexible; you can Copy one project to another or Erase a project, and of course, Save projects. For each of these operations, there is a confirmation screen that asks you to confirm the action. The instructions below show the confirmations screens.

6.1. Managing Projects

After using your Keystep Pro for a while you 'll probably have a large number of sequences. You may be working on a musical project and want to create a selection of you sequences that you can use for the project or a performance. Projects are designed for this kind of situation.

The internal memory of the KeyStep Pro holds a total of 16 Projects. You could think of a Project as a single song (although it could be an entire performance). Each project contains:

- 16 patterns for each of the four sequencers (SEQ1, SEQ2, SEQ3, SEQ4 and DRUM), including all of the Swing, Randomness and Probability settings for each pattern
- A Control Mode preset (i.e., a controller map), with independent settings for each assignable control
- 16 Scenes
- Project-level settings for Tempo, Swing, Randomness and Probability.

Please refer to Chapter 7 [p.104] for information about other parameters that affect the way Projects respond when you switch from one project to the next.

> ▬ ! It's important to save the patterns you've been working on before switching to another project. You will lose them if you forget to save them. Hold SAVE and press a Track button to save all patterns in a track. Hold SAVE and press Project to save all pattern in the current Project.

6.1.1. Loading a Project

To create a new project, hold the Project button and choose an empty project by selecting one of the 16 step buttons.

To load an existing Project, hold the Project button and press the Step button that corresponds to the number of the Project you want to load. Be sure you have saved your current Project somewhere before you do this!

An alternative way to load a project is to hold PROJECT and turn the selection encoder. Select a project and press the encoder to load it.

Don't hesitate too long, the operation will be cancelled if you do.

Projects can also be loaded during a performance while the sequences are running.

> ▬ ♪: The MIDI Control Center [p.124] has a parameter that allows you to specify whether the new Project should be loaded instantly or wait until after the (drum) sequencer reaches the end of its current pattern. See the Wait to Load Project [p.101] section to learn about this feature.

6.1.2. Saving a Project

> ⓘ !: When you follow the instructions below you will overwrite the selected Project and all of its patterns. Be sure this is what you want to do! If not, be sure to find out which memory location is available and store the Project there instead.

To save a Project:

- Hold the SAVE button
- Press the PROJECT button

The Screen will now ask you to confirm that you want to save the current project. If that's ok press the encoder. Press the encoder to confirm your decision or press EXIT to cancel.

To recall this Project later follow the steps described in the section above.

After pressing the SAVE button, press the encoder switch to perform the actual SAVE. A warning screen will then come up asking you whether you want to save. Press the Encoder a second time to make the save.

Tip: Saving a project will save all edited patterns. It's a quick way to make certain you save all your changes.

6.1.3. Copying a Project

You can also copy a Project from one location to another, even if no edits have been made.

To COPY one project to another, hold the COPY button and press the Project button. You can only copy the currently loaded project to a chosen destination project.

Pressing the COPY button will change the screen to show the currently loaded project as well as the destination project. The destination project will always be the current project+1. Press the selection encoder to confirm the copy. Again when you press the Encoder, you will see a warning message asking if you want to perform the copy. If that is what you want, press the Encoder to confirm or press Undo (SHIFT + EXIT) to cancel the copy.

Warning! If project 16 is current and you want to save it, it will be stored in project one, overwriting project one in the process.

Note: PASTE has no function on Project level.

6.1.4. Erasing a Project

You can, of course, ERASE the current project. ERASE will clear all patterns in all SEQ/ARPs including all settings.

Doing this will leave all the MIDI/CV routings and setting in place. Only the pitches, steps, velocities, etc. will be removed.

To ERASE a project, hold the Erase button and press the Project button.

At this point, the LCD will flash a message asking you whether you want to erase this project. Erase the current project by pressing the Encoder or choose a different project to ERASE by turning the encoder and selecting another one.

Note: Again, if you change your mind during the erase process press EXIT to stop the process, and return to the currently loaded Project.

6.2. All about Tracks

The track is the central place where you create melodic sequences, drum sequences and arpeggios. A track can hold 16 patterns that you can edit and arrange to your heart's content. You can duplicate a pattern to another pattern in the same track or an empty pattern in another track.

There are two kinds of tracks, the standard track that holds sequences and arpeggios and there is the control track which you will probably use less often but offers fascinating options for control of external synthesizers and Eurorack modules.

The Control track lets you use the 5 encoders with LEDs as CC# encoders and create CC# sequences. In every other aspect, it behaves like a normal track.

Track 1 can be either in Drum or Seq mode. Tracks 2..4 can either be in Arp or Seq mode.

Note: When you save the current situation of the tracks in a Scene your track selection will be saved with it.

6.2.1. Selecting a track

To select a Track press one of the Track buttons. The button of the selected Track will light up and as soon as you start to play notes the LEDs above the keyboard will light up in the colour of the current track.

6.2.2. Muting a track

Mute a track by pressing the [Mute] button. The Mute button will turn red. You can mute multiple tracks simultaneously. When a track is muted and selected, the keyboard can be used to play notes on the track's MIDI channel.

6.2.3. Soloing a track

The Mute button has a second option: to SOLO a channel hold SHIFT and press its mute button. The Mute button now turns blue. Solo is exclusive, only one track can be soloed at a time.

The Solo function is intelligent, when you deactivate it by pressing it once more it will return to the state it was in before you pressed it. If you pressed it from Mute state, it will return to Mute, if the track was active when you pressed it, it will return to active track state.

Pressing this button again (with or without SHIFT pressed) exits SOLO mode, goes back to mutes if there were some active ones. Except for current track that becomes unlit. SOLO takes priority over Mute.

6.2.4. Creating Splits

By splitting the keyboard in two you can play a sound on the lower part of the keyboard that is different from the sound you play on the upper part of the keyboard. Splits are a handy feature is you want to solo with your right hand over an accompaniment you play with the left.

To create a split hold a first Track button and press another Track button. While holding the two buttons you can press a key to define the split point (lowest note of the upper part). The first Track button that gets pressed becomes the upper part. The LEDs over the keyboard will tell you with is which by displaying the colour of the tracks that make up the split.

The default split point is the 2nd C of the keyboard. The upper part has all MIDI notes above the split point, included. When there is an active spilt, you can still hold the two track buttons, to set another split point.

To deactivate the split press the two track buttons simultaneously. On release, the split will be deactivated.

While the split is active you can still switch focus between the two tracks by pressing one of the two track buttons. Transpose, Octave, Bend, SHIFT + key, steps and the changes you make with the encoders apply to the track in focus.

The track that is in focus blinks and the steps buttons will light up the colour of the track in focus. The state of the OVERDUB and HOLD buttons are maintained.

The keyboard in Seq mode is always used for playing or transposing. You can select another track, which will temporarily exit split mode but the split is still "memorized" in the background, though not displayed while none of the two split tracks is selected.

Note: Transpore ignores the split point. Holding TRANS and pressing a key transposes the track that is in focus.

6.3. Patterns

A pattern contains the note information for a given track. There are 16 patterns per track within a project.

6.3.1. Selecting a pattern

There are two ways to select a pattern. You can press the [>] buttons in the track to navigate patterns or you can hold the PATTERN button and press one of the 16 steps to select a pattern directly.

When a Pattern is selected (as opposed to a Chain), the PATTERN button will be lit.

6.3.2. Managing patterns

When loading a pattern, you load it from internal memory to working memory. All changes you make such as nudge and randomize will be performed on this copy in working memory. You can at any moment see which patterns are still in their unaltered state and to which ones you have made changes. Hold SAVE and the patterns that contain unsaved changes to will light up in red, unaltered ones will light up in blue.

Why is this important?

The KeyStep Pro is very much an improvisation tool when you load a pattern you have many tools available to create variations of the current pattern. When making these changes some of them will turn out ok others will turn out disastrous. In a situation like that, you want to be able to switch back to the original state of the pattern and undo your failed experiment. To reload the original version of your pattern hold SHIFT and press SAVE. The OLED screen will display "pattern reloaded".

To SAVE the patterns held in working memory hold SAVE and hit the steps of the patterns you wish to save.

This is a great new feature that enables you to save sequences/patterns selectively.

A shortcut to saving unsaved patterns is to press SAVE and hit the Track button to save all patterns of the active track.

6.3.3. Copy, Paste & Erase Sequencer Patterns

In a previous chapter we've explained how to copy steps within a pattern. In this section, we'll explain how to copy and paste a pattern; to another pattern or a pattern in another track.

Holding COPY + Pattern starts Pattern copy mode. You know you're in Pattern copy mode when Copy and Pattern buttons blink.

To copy one pattern:

- Hold COPY and press Pattern. Saved patterns will blink in Blue, patterns with unsaved edits in RED

- The OLED Screen displays "Select Pattern to Copy, Press Exit to Cancel" inviting you to select a pattern or cancel.

- Hit the step of the pattern you want to copy.

- Hold PASTE and press the step where you want to save the pattern

If you want to copy a pattern to more than one location:

- Hold COPY and press Pattern. Saved patterns will blink in Blue, Patterns with unsaved edits in RED.

The OLED Screen displays "Select Pattern to Copy, Press Exit to Cancel" inviting you to select a pattern or patterns.

- Keep the COPY button depressed and press the button of the Pattern you want to copy.

The Pattern Step buttons display the current state of the patterns:

- Blue for a pattern that is saved

- Red for a pattern with unsaved modifications

- Unlit for an empty pattern

Pressing a step activates/completes the Copy operation and stores the Pattern in the copy buffer.

Now Hold PASTE+ PATTERN. Again the steps will light up and display the current status of the steps:

- Blue for a pattern that is saved
- Red for a pattern with unsaved modifications
- Unlit for an empty pattern

Keep holding the PASTE button and press the step buttons of the locations where you want to copy the pattern to.

If you now press steps, the content of the copy buffer will be pasted into the patterns you select. Press the Exit button to exit the Paste process.

6.3.4. Copy, Paste & Erase of Drum Patterns

Copying Drum patterns is identical to copying sequencer patterns.

- Hold COPY and press Pattern. Saved patterns will blink in Blue, patterns with unsaved edits in RED

- The OLED Screen displays "Select Pattern to Copy, Press Exit to Cancel" inviting you to select a pattern or cancel.

- Hit the step of the pattern you want to copy.

- Hold PASTE and press the step where you want to save the pattern

If you want to copy a pattern to more than one location:

- Hold COPY and press Pattern. Saved patterns will blink in Blue, Patterns with unsaved edits in RED.

The OLED Screen displays "Select Pattern to Copy, Press Exit to Cancel" inviting you to select a pattern or patterns.

- Keep the COPY button depressed and press the button of the Pattern you want to copy.

The Pattern Step buttons display the current state of the patterns:

- Blue for a pattern that is saved

- Red for a pattern with unsaved modifications

- Unlit for an empty pattern

Pressing a step activates/completes the Copy operation and stores the Pattern in the copy buffer.

Now Hold PASTE+ PATTERN. Again the steps will light up and display the current status of the steps:

- Blue for a pattern that is saved
- Red for a pattern with unsaved modifications
- Unlit for an empty pattern

Keep holding the PASTE button and press the step buttons of the locations where you want to copy the pattern to.

If you now press steps, the content of the copy buffer will be pasted into the patterns you select. Press the Exit button to exit the Paste process.

6.3.5. Erasing patterns

Holding Erase + Pattern starts Pattern Erase Mode (Erase and Pattern blink)

The OLED Screen displays "Select Pattern to Erase"

As with Copy and Paste operations, the Pattern Step buttons display the current state of the steps in the pattern according to the below colourization:

- Blue for Saved

- Red for unsaved modifications

- Unlit for Empty

Pressing a step completes the Erase. If you want to erase several patterns simultaneously, hold the Erase button depressed and continue to erase multiple patterns. To exit Erase mode press EXIT.

6.3.6. Undo

There's of course always the risk that you erase something unintentionally. Fortunately, the Keystep Pro has an UNDO function. It can't save you all the time, but when available, usually after a critical erase, the Exit button blinks.

Press SHIFT + Exit undo an ERASE or PASTE action.

UNDO is also useful to undo the last recording you made. UNDO will restore the state of the KeyStep Pro to the situation before the recording.

Note: UNDO will only undo Erase a Paste action, it will not undo Randomizing notes in a pattern or any of the other Shift functions.

6.4. Arranging

A Project is much more than a collection of saved patterns. A project has two additional options; chains and scenes. Scenes enable you to store and recall snapshots of a situation. In a Scene, you store everything that is currently playing; the state of the project, the patterns and the chains running in each track. Chains are about creating and playing back chains of patterns. In a chain, you program the order in which pattern will pay.

Arranging already starts within a sequence. For instance, if you create a sequence of 16 steps long on the first pattern page and copy that sequence to page two (steps 32-31), page three (steps 48-63) and page four (steps 64-8O). In other words, you have three copies of the first 16 steps. More about this in the Top-Down [p.1O2] and Bottom-UP [p.1O3] sections later in this chapter.

6.4.1. Chains

A chain is a sequence of patterns that will play one after the other. Chain mode automates the selection of patterns. In a performance or during when recording you don't to manually have to switch from one pattern to another. Each Track can have its own chains. Up to 16 patterns can be chained together.

When a Chain is selected (as opposed to a Pattern), the CHAIN button will be lit.

6.4.1.1. Creating a Chain

To create a chain, hold the CHAIN button and press steps in the order you wish to store in the chain. The steps will blink in the order where they were entered. Keep an eye on the OLED screen, it will display how many patterns are currently stored in the chain. When you press play, the chains you programmed in each track will take care of changing patterns.

An existing Chain is replaced when you create a new one.

6.4.1.2. Mastering Chains

Mastering chains is the essential skill you need to make good arrangments.

When creating a song or a more large scale composition you'll probably arrive a moment where you have several sequences in each track. You don't want all of them to play simultaneously but may want to start with a sequence in track 1, repeat it 2 times after which a sequence of Track 2 will join in and play 2 times.

Something like this:

Track 1	Track 2	Track3	Track4
first sequence			
first sequence			
second sequence	first sequence		
second sequence	first sequence		
	second sequence	first sequence	
	second sequence	second sequence	first sequence
			second sequence

How do you create a song structure like that?

The trick is to use an empty dummy pattern to create silence in the chain. Just leave pattern 1 of each track empty for that purpose. Fill patterns 2 and 3 with sequences.

Creating the chain for Track 1 is easy. Hold chain and press pattern 2, which holds the first sequence twice, press pattern 3 twice, press pattern 1 three times to fill the remaining part of the chain with dummy tracks.

When creating the chain for Track 2 we start with the dummy track:

Select track 2

Hold chain and press pattern 1 twice to enter two empty dummy tracks.

Fill remainder of the chain with the patterns and one dummy: 2, 3, 2, 3, dummy 1.

Track 3 starts with four dummies, second sequence, 3 and another dummy, Track four with five dummies and its patterns 2 and 3.

It will now look like this:

Track 1	Track 2	Track3	Track4
first sequence	dummy (1)	dummy (1)	dummy (1)
first sequence	dummy (1)	dummy (1)	dummy (1)
second sequence	first sequence	dummy (1)	dummy (1)
second sequence	second sequence	dummy (1)	dummy (1)
dummy (1)	first sequence	first sequence	dummy (1)
dummy (16)	second sequence	second sequence	first sequence
dummy (16)	dummy (16)	dummy (16)	second sequence

Make certain to save this to a Scene:(SAVE + SCENE + Step). Because it took some effort also save the current Project (SAVE + PROJECT) and press the encoder to confirm the save.

Note: If you find this easier to work with use pattern 16 as a dummy.

6.4.1.3. Saving Chains

If you want to save your chain don't forget to save it before doing a power off. You save the chains you've created for each track by saving the current project with SAVE + Project and pressing Confirm.

6.4.2. Scenes

A scene is a "snapshot" of patterns and chains running in each of the four tracks. 16 scenes can be stored and recalled within a project.

- A scene contains the mode for each track (drum / seq / arp)
- A scene contains the mute status of each track
- When a scene starts it activates the track that was selected when you saved the scene.

Maybe "snapshot" isn't the right word. It makes you think it's a static image of what is happening at a given moment. Scenes are more than static snapshots; a scene stores and recalls everything that is going at a given moment; the chains that are playing all become part of the scene. Not just the chains of the currently active sequencer, but all chains running in all sequencers. If Arpeggios are running in a hold state while you save the scene they too will become part of the stored scene. Recalling and starting a scene is the start of a dynamic musical event.

Each of the 16 projects can hold 16 scenes. Doing the calculations yields a total of 256 scenes for you to store to and recall from.

6.4.2.1. How to Make a Scene

Saving a Scene

Hold SAVE and press the SCENE button to enter Scene Save mode. The 16 steps will blink, waiting for you to select a destination. Empty scenes will blink once in blue. Scenes that have content will blink in blue, with a faster rate. Pressing a step will memorize the Patterns and/or Chains that are used on each of the four Tracks. If a Track is in a different mode than the one stored in the Chain, recalling the Chain will switch to the appropriate mode. You can keep the Save button pressed and save to multiple Scenes. Scenes are automatically saved within the project when you save a project. Press Exit to cancel saving.

Scenes can be Erased, Copied and Pasted in the same way as Patterns.

Selecting and loading a Scene

To select a scene, hold the SCENE button and press one of the 16 step buttons. Empty scenes will be unlit, loading them has no effect. Scenes with previously-stored content will light up in blue.

> **Note**: The Wait to Load Pattern [p.44] setting also determines when the next Scene will load.

Erasing a Scene

Hold ERASE and press the SCENE button to enter Scene Erase mode. The moment you let go of the two buttons, the 16 steps will blink, waiting for you to erase a Scene. Empty scenes will only blink once. Scenes that have content will blink in blue. Pressing a step will overwrite the Patterns and/or Chains that were stored in this Scene step. If you want you to erase several Scene keep the Erase button pressed and erase them. Once erased, the step will blink once in blue then turn off. Press the Exit button to exit Erase mode.

Switching Scenes

You can set the Scene Launch Quantize from the Utility menu (SHIFT + Project). The options are 1 beat, ½ bar, 1 bar, 2 bar, 4 bar.

Note: Scenes are saved in the Keystep Pro's internal memory, so when you switch the Keystep Pro off and turn it back your scenes will still be there.

All patterns of all sequencers (but not the Arpeggios) will reset when a new scene is loaded.

6.4.3. Wait to Load

The KeyStep Pro can play Patterns, Chains in a Project and Scenes. With so many 'play' options in a controller, you need a way to specify when to switch from one Scene to another, from one Project to another. Do you want switch Scenes the very moment you select a new Scene, or should the current Scene play to its end first? Same with patterns; do you want to play them in full, or change instantly when a new pattern is selected?

You can perform the magic you need with the 'Wait Load ' button of step 16. If Wait Load is activated with SHIFT + 'Wait Load' the Keystep Pro will check the settings in Utility to see whether it changes should be instant or delayed until a Pattern/Project/Scene ends.

Note: When 'Wait to Load' is active step 16 is blue.

You set the Wait to Load' options with 'Launch Quantize in Utility or the MIDI control center.

The wait to Load options for Patterns can be set directly with the SHIFT button: Hold SHIFT and press Step 16/Wait Load to switch instant change on or off. In Utility>Launch Quantize or in the MIDI Control Center you can set what will happen when Wait Load is active: the switch can either be at the end of the bar or the end of the pattern.

6.4.4. Step Skip

An interesting feature is STEP SKIP; you can hold a step and press the 16, 32, 48, 64 buttons to select whether or not a step will play.

The rule is as follows : By default, all four 16, 32, 48, 64 (aka page-) buttons are lit. Suppose you have created a sequence with 3 copies of the first 16 steps, so all 64 steps have content. If you do not want the 5th step to play in the 32 page and the 64 page, HOLD the step and press 32 and 64.

Another example: if page 16 and 48 are lit when holding step 1, and the sequence is 1 bar long, then step 1 will play on the 1st bar and the 3rd bar, and it will not play on the 2nd and the 4th.

It is possible to deactivate all four iterations of a note, in which case we will show it with a dimmed LED. This is a good way to ˝silence˝? a note without losing its content.)

NOTE: This also works in Step Edit mode.

6.4.5. Top-Down

There are two ways you can start composing and songwriting on the Keystep Pro. The first is the top-down approach. It's similar to a writer who sketches a storyline for a book. She will start by writing a series of scenes that will make up the story.

She'll then start to fill the scenes with characters, places and plots until every detail of the story has unfolded.

Composing/ writing songs on the Keystep Pro can be similar. You'll start by designing scenes:

Scene 1:

- voice 1: drum, 2 chains, 3 patterns
- voice 2: sequencer, 4 chains, 5 patterns
- voice 3: arpeggio on hold

Scene 2:

- voice 2: sequencer, 4 chains, 5 patterns
- voice 3: sequencer, 6 chains, 8 patterns
- voice 4: arpeggio on hold

Scene 3:

- voice 1: drum, 2 chains, 4 patterns
- voice 2: sequencer, 2 chains, 7 patterns
- voice 3: sequencer, 4 chains, 9 patterns
- voice 4: arpeggio on hold

This is also the moment where you make the other top-level decisions about TEMPO, SCALE and DRUM mode:

Scene 1:

- Tempo; 140 BPM, Scale; Minor, Drum; MONO mode.

Scene 2:

- Tempo 80 BPM, Scale Dorian.

Scene 3:

- Tempo 160, Swing 60%, Scale Harmonic Minor, Drum POLY.

To prepare even further, you could set up these configurations at the start of your composing session and already save them in scenes.

After completing this compositional structure you start to create the patterns that will make up the composition. By the look of it, this is already becoming a large scale composition.

6.4.6. Bottom-UP

The second approach is more bottom-up. You'll start by creating patterns, improvising as you go. Developing more and more patterns by mangling, inverting, transposing a number of basic patterns with themes.

Next, you 'll want to organize these patterns in chains, feeling your way through combinations of pattern, making decisions about how to chain the patterns for the musical effect you're after.

In the final stage, you decide which voices will play and save choice in a scene. You repeat this until you have three or more scenes.

Both approaches have their merits and it's probably a good idea to give both approaches a try to see what fits your style of songwriting/composition.

Things to try:

Create very short patterns of only two notes, but vary velocity and gate length in each pattern.

Keep the number 'twelve' in mind when making decisions about pattern length. Twelve can be divided in many ways;

- 2+2+2+2+2+2
- 3+3+3+3
- 4+4+4
- 6+6

and mixtures of these numbers:

- 2+3+2+3+2
- 4+2+6

and many others. By combining patterns of these lengths it is easy to keep your patterns more or less in sync. Of course, if sync is not what you're after, throw in a few odd numbers.

And don't forget to enjoy it.

7. TIMING

This chapter is about timing. How do you sync your external gear to the Keystep pro? Or the other way around; how do you sync sequencers and arpeggiators to an external sequencer or a DAW? Hopefully, you'll find all the answers here.

7.1. Tempo

You can set the tempo using the Tempo encoder from 30 to 240BPM.

You can set the decimal value of the tempo by holding SHIFT and turning the Tempo encoder. Moving any other knob without holding SHIFT will remove the decimal part.

The KeyStep Pro can switch between two Tempos: Global Tempo and Project Tempo. The Global Tempo can be set using SHIFT + Step 15/Global BPM. An empty project will always in the standard Project Tempo which is 120 BPM. If in a project you change the Tempo settings and save the Project, the new Tempo setting will be stored with the Project. Reloading the Project will reload it with the Project tempo.

You can override the Project tempo at any moment by holding SHIFT and pressing step 15. When lit (in Blue) the Global tempo is active. When unlit the Project Tempo is active.

7.1.1. Making it Swing

Turn the Swing encoder to set a Swing amount. If you've listened to music before (it's unlikely you haven't) you have heard swing. It's when musicians play just before or after the beat. This is often used in Jazz and South American music. It awakens an emotion of freedom, of not being forced into a fixed rhythm. It is particularly effective when you mix "straight" notes with "swung" notes. The swing range goes from 50% - 75%. By default, it is 50%.

Swing has an important second function, you can use it to add an offset the Swing Amount of the current track. Track 1 could use 53% Swing and Track 2, 57%. The effect is very subtle but it can help make a track stand out.

To add Swing Offset to a track:

- Select the track
- Hold SHIFT + SWING and turn the encoder to the right. The display will show the offset amount. An amount of 50% equals no offset, an amount of 75% equals maximum offset.

7.1.2. Metronome

The Keystep Pro has a metronome function that enables you to hear the tempo as well as count in's before real-time recording. By default, the Metronome is off. To turn it on hold SHIFT and press the Tap Tempo button. An encoder on the back of the KeyStep Pro enables you to change the volume of the built-in piezo speaker.

There are three ways to change the Metronome settings:

For a quick edit of the time-division hold Tap Tempo and press one of the time-division settings above the keyboard. While the button is held, LEDs above the keys will show the current time division.

For a more detailed edit of the Metronome setting hold SHIFT +Utility. Scroll down to Metronome. The settings you'll find here are more extensive and enable to set:

- output medium of the metronome (line, speaker + line, speaker)

- count-in (off, 1 bar, 2 bars)

- time division (1/4, 1/4 triplet/ 1/8, 1/8 triplet, 1/16, 1/16 triplet, 1/32, 1/32 triplet)

- time signature(1, 2, 3, 4, 5, 6, 7, 8, 9, 1O, 11, 12, 13, 14, 15, 16)

Combining these last two settings enables you to create beat settings: 8/4, 3/4, 2/4 7/3). The metronome will always put an accent on the first beat.

Next to the metronome volume encoder, you'll see an output jack. You can use this output to send an audible click to other musicians. The output level is at standard line mixer level.

The third option for changing the Metronome settings is the MIDI control Center. The settings you'll find there are the same as in KeyStep Pro Utility menu.

7.1.3. Tap tempo

You can set the tempo by tapping on the Tap tempo button repeatedly. Two taps are already enough for the metronome to guess the tempo you want to set. With more taps, the tempo approximation will improve.

SHIFT + Tap Tempo toggles the Metronome On or OFF.

7.2. Sync

When you connect your Keystep Pro to an external device; a synthesizer a computer running a DAW of the Eurorack system, you'll need a way to sync that external device to the KeyStep Pro. That is where Sync comes in.

The KeyStep Pro has a Sync out for sending sync signals and a Sync in for receiving sync signal from external devices.

SHIFT> Utility> SYNC opens the Sync menu. Here you can view and set the sync options :

Sync		Values	Description
Input	Source	[Internal, USB, MIDI, Clock, Auto (d)]	Defines tempo and sync source
	Clock Rate	[1 PP16, 2 PPQ, 24PPQ (d), 48PPQ]	Allows you to choose from the different analog clock rate types
Output		[1 PP16, 2 PPQ8, 1 PPQ, 1PP2Q, 1 PPQ4Q, 2PPQ, 24PPQ (d), 48PPQ]	Use these settings to sync KeyStep Pro to various analog clock types

These settings allow you to specify the input- and output response to various synchronization and tempo options. By changing these settings you determine which clocking signal will be transmitted and recognized by the Clock input and output connectors.

Auto Mode works like this : if no clock is received, you can set the tempo, press Play. It will then behave as in Internal mode. If Clock / MIDI transport control is received this clock takes priority over the internal clock. The resulting tempo is calculated based on the external clock. When the external clock stops the sequencer stops.? If a Stop MIDI message is received, running sequencers will stop.

Category	Parameter	Description	Utility	MCC
Sync Output				
	[1PP16, 1PP8, 1PPQ, 1PP2Q, 1PP4Q, 2PPQ, 24PPQ, 48PPQ,]	allows you to adjust the Tempo setting to other PPQ standards	x	x

This menu enables you to set the Clock type for the analog output clock : 1Pulse per 16th (clocked) 1 pulse per 8th (1 pulse every two 1/16ths) 1 pulse per quarter 1 pulse per 2 quarters 1 pulse per 4 quarters, 2ppQ, 24PPQ 48PPQ

7.2.1. Sequencer Sync

The Sync option is the key to unlocking the creative power of the sequencers. By default, sync is on.

When Sync In is active (set to AUTO) the Keystep Pro's tempo will lock to the nearest multiple of the tempo of the incoming clock signal.

By default sync is active and the Sequencer Sync Rate is set to 1/16. In this position one sequencer step equals 1/16th of a four-beat measure; the sequencer will advance one step with every four beats. If you double the rate to 1/32 the sequencer will run twice as fast.

7.3. Sync/Clock and Reset Outputs

You can select from the Sync menu whether the clock and/or transport signal will be sent on each of the following outputs :

- USB
- MIDI1
- MIDI2
- Clock out

The Reset output sends a [4ms 5V high] signal whenever you press STOP or after a sequence reset with SHIFT + PLAY.

The Clock output in its ON cycle is +5V with should be enough to trigger even the most unresponsive Eurorack modules.

7.3.1. Stop, Start & Continue

Other settings in the Utility menu will determine how the Keystep Pro will send and respond to the Stop, Start & Continue commands it receives. For details please refer to to learn more about this.

8. CONTROL MODE

8.1. What is Control Mode?

When KeyStep Pro is in Control Mode every encoder and step button on the right half of the unit can transmit specific MIDI data to external devices that are connected to the MIDI output jack. This same data will be sent to your computer via USB.

Things to remember when you're in control mode:

Several features are disabled in Control Mode:

- Selecting another track will exit control mode.

- You save a control track the same way as you do normal tracks.

- The MUTE button is mute, it does not do a thing in control mode.

8.1.1. What are CC# values?

When you draw notes in the editor of your DAW you are, without knowing it, creating MIDI data. With each note, you create a note-on message, a gate message, a note-off message and a velocity value. The velocity value imitates how strong a note is struck on the MIDI keyboard. When you connect an external synth such as the MicroFreak to a DAW and press "play" the DAW will send a stream of MIDI note numbers and velocity values to the Microfreak. The MicroFreak understands these codes and will play your DAW sequence the way you intended. Note and Velocity values (as most values in MIDI) are in the range 0-127.

There's another kind of MIDI data that allows you to control parameters on external synths and modular systems. These control codes differ from the note related MIDI messages. They are known as CC# codes; small strings of numbers that are specifically designed to control parameters on an external MIDI device, on a Modular hardware system or a software Modular system such as VCV Rack.

MIDI CC# codes have existed for over 40 years and despite their enormous potential they are not widely used.

When you turn one of the five encoders on the KeyStep Pro and the Keystep Pro is in Control mode it will transmit a CC# code.

The default CC# values that will be transmitted:

Encoder	CC# value
1	74
2	75
3	76
4	77
5	78

The problem with CC# values is that you can never be certain whether they are being transmitted, unlike notes that will either sound or not. Fortunately, there are two ways to understand what is going on. When turning an Encoder its value will be displayed in the OLED screen. To know more details about what is going on check Utility>Controller>Knob (1-5).

Secondly, there is an option in the MIDI Control Center that enables you to check what's going on:

- Load the MIDI Control Center
- select 'MIDI console' in the View menu
- active Control Mode on the KeyStep Pro

If you now turn the encoders you will see their CC# values displayed in the console window.

Note: If you're the lucky owner of Arturia Pigments you could map these four controllers to Pigment's four macro knobs.

8.1.2. CC# patterns

A pattern in the Control Track runs in parallel with the normal patterns. An action you apply to a 'normal' pattern will also affect the control data stored in the control track. If you inverse the the 'normal' pattern the control track will also play it control data in inverse order.

Is it possible to create 'empty' track containing control data only? Yes, it is. You could even assign one of the tracks to 'play' control data exclusively and use it to control parameters on external synths of your modular system.

Each of the 16 patterns in a Project can be used to stored Control Data. To load a CC pattern, you must be in Control mode, press and hold the Pattern button and press a Step button.

Chaining patterns is a way to Chain patterns containing control data.

Save using SAVE + Pattern, like regular sequence tracks.

Everything is handled just like the four Sequence Tracks, except that there is no display for pattern number and no Mute button.

8.2. The Automation Sequencers

Without a doubt, the control track is one of the most exciting features of the Keystep Pro. If you've used a DAW like Ableton or Logic in the past you will be familiar with automation lanes. The control track is the KeyStep Pro variant of an automation lane. The control track has

A sequence pattern record notes (the pitch of a note) and velocities (the strength with which you hit the key); In control mode, you can record knob positions in a pattern and play that automation data back along with the note sequencer. A control pattern is a ghost sequencer that runs parallel to the note sequencer and plays knob positions. It transmits these knob positions in the form of CC# values that external synths (or your DAW) understand and can respond to.

8.2.1. Using patterns to store and playback CC values

In Control mode the patterns you create on the KeyStep Pro will act as automation lanes. You can store CC# values in them that will control parameter on external synthesizers.

If you know the CC# of a synth's knob you can use that CC# to control that parameter. Simply define an encoder to send that CC# value to the synth and then fill the steps with CC values to control the synth.

CC# codes are thus the MIDI equivalent of turning knobs. The MicroFreak, currently one of the most popular Arturia Synthesizers, has very sonically interesting CC# control options: turn the Filter knob on the MicroFreak and its cutoff point will change. Send CC# 23 codes to the MicroFreak and it will have the same effect: sending CC# 23 with a value of O closes the Filter completely, sending CC# 23 with a value of 127 opens it fully. All in all, there are 2O different CC# codes on the MicroFreak available to control parameters.

8.2.2. Recording Control values in Step Edit mode :

To record modulation in Step Edit mode:

- Select the sequence into which you want to record events.
- Make certain "play" is off and turn on step recording by pushing the step edit button.
- Select a step of the sequence where you want to add control events.
- Now turn the encoder you want to record. While turning the encoder nothing will be recorded, but you can monitor what is happening in the display. The KeyStep Pro will show you the step you are adding modulation to, the active step, the parameter and its modulation amount. Once you've found an encoder position that you want to record, let go of the knob. The Keystep Pro will take a snapshot of the encoder and store it with the step.
- Continue to do this until you've filled every step with a CC# value.

If a CC# had no automation in the edited step, a knob movement will create an automation point for this step.

Turning the knob fully counter-clockwise reaches O, then turning more will deactivate the automation of this CC# for this step. We want a dead zone before deactivation so that it is easy to reach O without turning it off. you will have to reach what would normally be '-5' to turn it off.

You may have guessed by now that there are two ways to fill modulation tracks: you can fill a track and then continue to the next track taking snapshots of another knob, or you fill a step and record four knob positions simultaneously and then continue to the next step until all steps are full. Both methods have their pros and cons.

To erase the control values in step turn the encoder fully counter-clockwise until it reaches O. Continue to turn beyond the zero point and automation in this step will be deactivated.

Note: Sequence functions like Lst Step, Extend, Duplicate content, Step/Page Copy Paste, Clear Pattern, Clear Steps, all behave as in normal mode. A CC# track is always in 1/16th resolution.

8.2.2.1. Match&Go

Before attempting to control an external synth with CC codes. The MIDI channel the KeyStep Pro transmits on must match the MIDI the synth receives on. If the receiving synth is set to receive on all channels simultaneously you have nothing to worry about. If however your KeyStep Pro is connected to several synths and a DAW and you want to be able to send different control data to each synth, you'll have to assign a different MIDI channel to each synth and adjust channels on the KeyStep Pro accordingly.

If you are the happy owner of a MicroFreak you can try the following example. We've configured the MicroFreak to receive on channel two with Utility>MIDI>Input>2 and activated Control mode on the KeyStep Pro to perform our control magic.

If you don't own a MicroFreak (you're missing out on something special) you can learn from this example anyhow because the workflow is the same for other synths.

We'll select a MicroFreak parameter with a very drastic effect, so it immediately clear where the control works or not. We'll use CC control to change the Oscillator model on the MicrFreak!

By default, the MicroFreak will receive on all 16 channels. So we can send our CC# value from any track. By default Control Mode will transmit on MIDI channel 1.

We will assign CC# value 9 to Encoder 1 (Pitch). CC# 9 is CC# value that changes Oscillator type on the MicroFreak.

- hold SHIFT + Project to open Utility
- scroll down to Controller, press the encoder to select this submenu
- select knob 1 and continue to select CC
- select cc# value 9

If you now turn encoder 1 you change Oscillator type on the MicroFreak. What's more, because we started on Track one, we can use the steps on any of its patterns to control Oscillator type on the Microfreak.

Remember how a step takes on the current value of an encoder when you activate it? You can use this to program a series of Oscillator type changes.

- activate control mode if it is not already active

- select a pattern on track one

- press Step Edit to activate Step Edit mode

- set encoder 1 fully counter-clockwise

- press step 1, 3, 5, 7 to store 'O' values in those steps.

- set encoder 1 in its mid position

- press step 2

- repeat this for steps 4 and 6 (remember to set the encoder in the mid position)

Play the sequence. You should now hear the MicroFreak alternating between oscillator types.

Note: There is an option in the MIDI control center that enables you to set a control range for every Encoder. You could use this feature to limit the range of the controller 1 to the range 5O to 1OO and thus only select specific oscillator types. To set this range click on 'device settings' in the MIDI Control Center and changes the values listed under controller> knob 1 min and max range.

8.2.3. Controlling parameters on a DAW

CC# codes make it possible to control parameters of the plugins you use with your DAW! All plugins of the Arturia V collection series have a MIDI learn feature that enables you to link knobs on the KeyStep Pro to knobs on the plugin. Imagine the new sonic options you have when using the Encoders on the KeyStep Pro to control the filters on the CZ V, the DX7 V, and the Buchla Easel V simultaneously.

Please refer to the documentation that comes with your DAW and the V collection for info on how to do this.

Note: CC# values transmitted over MIDI can also be used to control parameters on a Modular system, but to make that possible you need to have a module that knows how to convert these CC# values to analog voltages.

The controller assignments can be set using the and in Utility>Controller.

8.2.4. More about CC# sequences

The CC# values can be sequenced as we've seen in the previous example. But, they can also be used in a more general way to set parameters in an external synth. If you send a CC value in the first step of a sequence and there are no other values programmed in the sequence this value will be held during the sequence. This feature thus gives you the creative option to send a new configuration to the external synth at the start of each pattern!

Tip: Patterns can be chained. Patterns containing Control values are no exception. If you have three similar patterns chained, you could store control values in the first step of each pattern. In the first pattern you store a CC# value that opens sets the filter half-closed, in the second pattern you store a value that opens the filter a bit further, the third pattern opens the filter completely.

Here is a drawing with four CCs and four steps.
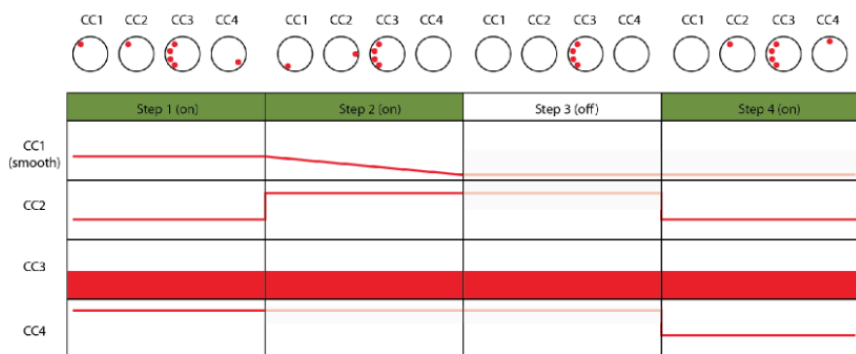
If you use the steps of sequences to send different control values in each step there is a feature you can use with great effect: the looper. The Looper also works in control mode. If you loop part of a sequence you will also loop the control values in that part of the sequence.

Note: There is one important difference between standard tracks and control tracks; a standard track can be muted, a control track cannot. It will always transmit controller data as long the track is playing.

8.2.5. Visual feedback

If at least one CC# has recorded automation in a step, this step will be lit. Otherwise, it is unlit.

If a knob has recorded automation, its LED ring will show only one moving LED (or one lit and one neighbour dimmed) that corresponds to the current value of the CC.

If a knob has no recorded automation, its LED ring will have all LEDs lit up to the value of the CC#(plus one dimmed LED at the end if applicable).

8.2.6. Real-Time recording CC# values

In the previous section, we looked at using control values in step edit mode. Control values can also be recorded and played back in real-time mode.

Recording control values is no different from recording notes: select a track and press Record and Play. You stop recording by either pressing STOP or RECORD is pressed or until the end of one full loop of steps is reached.

Again, it's vital to understand that Control Mode and Standard Mode are two different things: if you're in control mode and press SHIFT+ Clr Steps control values stored in the steps will be erased, but the note values will stay. The opposite is also true. Press SHIFT+ 'Clr Steps' in standard mode and only the notes will be erased, not the control values. Again, knowing this you can use it to your advantage by recording notes over existing control values.

Unlike recording notes that are only recorded in a step as long as there is a gate, control values are recorded more permanently: if you record a value in step one this value will be retained until the end of the pattern. If you touch other knobs, with other control values stored in them, at other moments (step 3 and 8), their control data will be layered on top of the first layer.

If you turn/touch a knob a second time during the next recording loop the control data will overwrite the existing data. It will leave other CC# values unchanged.

Once a loop is recorded, the Record button turns itself off.

8.2.7. Erasing CC# values

To Erase all automation currently recorded hold ERASE and turn one of the five knobs to clear all CC# values stored in it.

8.2.8. The Live track

Being able to program automation in patterns is a great feature, but what if you want to control an external synthesizer in a live situation with the CC# values stored in the Encoders directly? Or, create and modify a pattern containing control codes? It's easy, the track that is currently active when you press CONTROL becomes the Live track. The track button will blink slowly to remind you that you are in control mode. When in CONTROL mode you can control with control codes anything connected to this track using MIDI.

To drop-out of control mode press the button of the Live track again. All SHIFT functions are now again at your disposal.

Note: The Overwrite button has no effect while Control mode is active.

8.3. Top panel functions

Most of the performance controls on the left side of the front panel will control the same features in Control Mode unless configured otherwise with the MIDI Control Center. There are some slight variations, though, which we'll point out as we go through them:

8.3.1. RATE/FINE encoder

The RATE/FINE encoder works the same in all modes. Its functions are described in the KeyStep Pro overview Chapter. [p.14]

8.3.2. Metronome/Tap Tempo button

The Metronome/Tap Tempo button works the same in all modes:

- SHIFT + TAP/METRO toggle the metronome on and off.
- Tap the TAP/METRO button several times to set the tempo.

The MIDI Control Center [p.124] allows you to specify the number of taps it will take to set the tempo.

8.3.3. Swing Encoder

The Swing encoder controls the Swing percentage of the entire Project in Control Mode. In other words, the Swing percentage is applied to all sequencers equally. For a description of the Swing feature see the swing section of Chapter 6 [p.90].

8.3.4. Transport section

The Transport section works the same way in Control Mode as it does in the other modes unless instructed otherwise by the MIDI Control Center.

9. KEYSTEP PRO CONFIGURATION

The KeyStep Pro has many settings that you may want to adjust, and please don't hesitate to do so. It's not like the temperature setting on a fridge that you set once and then forget about it. Changes in these settings can make all the difference. The right settings will help you to develop a personal synthesis style.

For example, you're playing drums on the keyboard and it doesn't sound right because it doesn't match the way you are used to mapping your drums in your DAW. By changing the drum mapping in the Utility settings Utility>Drum Map>Config you can explore alternative options.

What if I want to use the touch strip to control the sustain of an envelope on an external synth, but its CC# value does not match the touch strip? Hint: try Utility>TouchStrip> MIDI CC#

Does selecting another velocity curve make my sequences snappier? Try changing the settings at Utility>MIDI Settings>Velocity curve.

Will changing the knob acceleration give me a better control experience? Change the settings at Utility>MIDI Settings>Knob Acceleration.

The answer to many of you questions can be found in the Utility menu of the Keystep Pro or the Device settings of Keystep Pro in the MIDI Control Center. In Utility on the KeyStep Pro, you can adjust settings specifically for a project. These settings are also available in the MCC.

9.1. The Utility Menu

The Utility menu is where you set and change most of the global settings for the Keystep Pro. 'Global' means that these setting are shared across all projects. They will be saved as soon as you exit the Utility menu. You access it by holding SHIFT and pressing the Project/Utility button. The Utility menu will open in the LCD screen. To navigate in the menu turn the encoder and click it to enter a submenu. To back up in a submenu press exit. Keep pressing 'exit' to leave the Utility menu.

9.1.1. MIDI Channels

MIDI Channels	Track	Values	Description
	Track 1 Input	[1-16, OFF, 1 (d)]	Input channel of Track 1
	Track 2 Input	[1-16, OFF, 2 (d)]	Input channel of Track 2
	Track 3 Input	[1-16, OFF, 3 (d)]	Input channel of Track 3
	Track 4 Input	[1-16, OFF, 4 (d)]	Input channel of Track 4
	Drum Input	[1-16, OFF, 10 (d)]	Input channel of the Drum sequencer on Track 1
	Track 1 Output	[1-16, OFF 1 (d)]	Output channel of Track 1
	Track 2 Output	[1-16, OFF 2 (d)]	Output channel of Track 2
	Track 3 Output	[1-16, OFF 3 (d)]	Output channel of Track 3
	Track 4 Output	[1-16, OFF 4 (d)]	Output channel of Track 4
	Drum Output	[1-16, OFF, 10 (d)]	Output channel of the Drum sequencer on Track 1

In the menu, you set the channels on which the four tracks will send and receive MIDI signals. The Tracks default to their track number, the Drum channel defaults to channel 10.

9.1.2. Sync

Sync		Values	Description
Input	Source	[Internal, USB, MIDI, Clock, Auto (d)]	Defines tempo and sync source
	Clock Rate	[1 PP16, 2 PPQ, 24PPQ (d), 48PPQ]	Allows you to choose from the different analog clock rate types
Output		[1 PP16, 2 PPQ8, 1 PPQ, 1PP2Q, 1 PPQ4Q, 2PPQ, 24PPQ (d), 48PPQ]	Use these settings to sync KeyStep Pro to various analog clock types

These settings allow you to specify the input- and output response to various synchronization and tempo options. By changing these settings you determine which clocking signal will be transmitted and recognized by the Clock input and output connectors.

Auto Mode works like this : if no clock is received, you can set the tempo, press Play. It will then behave as in Internal mode. If Clock / MIDI transport control is received this clock takes priority over the internal clock. The resulting tempo is calculated based on the external clock. When the external clock stops the sequencer stops.? If a Stop MIDI message is received, running sequencers will stop.

The Sync output menu enables you to set the Clock type for the analog output clock : 1Pulse per 16th (clocked) 1 pulse per 8th (1 pulse every two 1/16ths) 1 pulse per quarter 1 pulse per 2 quarters 1 pulse per 4 quarters, 2ppQ, 24PPQ 48PPQ.

9.1.3. Metronome

Metronome		Values	Description
	Output	Line, Speaker (d), Line Line/Speaker	Selects the output of the metronome signal
	Count-in	off, 1 bar (d), 2 bars	Selects count-in duration when starting Record
	Time Div	1/4, 1/4 Triplets 1/8, 1/8 Triplets, 1/16 (d), 1/16 Triplets, 1/32, 1/32 Triplets	Set number of beats in a measure
	Time signature	1-16, default 4	Sets the number of beats that make up a bar

To use the Metronome activate it with SHIFT + Tap Tempo/Metronome. The default time signature is 4/4. For example, to set the time signature to 5/8 set Time-division to 8 and Time signature to 5.

9.1.4. Launch Quantize

Launch Quantize		Values	Description
	Project	[off, 1 bar (d),2 bars, 4 bars]	Set the moment the KSP switches to another Project after selecting a new Project
	Scene	[1 beat, 1 bar (d), 2 bars, 4 bars]	Set the moment the KSP switches to another Scene after selecting a new Scene
	Pattern	[off, at end (d), 1 bar]	Set the moment the KSP switches to another Pattern after selecting a new Pattern

In this menu, you 'tell' the Keystep Pro how it should continue to the next Pattern, Chain or Scene. Should it wait for 1 bar, 2 bars or 4 bar to make the switch? This is useful in live performance settings where you may not want to interrupt the flow of the music between Projects.

If the Sequencers and the Drum pattern are of different lengths the KeyStep Pro will wait until the end of the Drum pattern before loading the next Project Scene or Pattern.

9.1.5. MIDI settings

MIDI settings		Values	Description
	Knob Acceleration	[Slow, Medium, Fast]	Sets the amount of acceleration applied to the encoders.
	Aftertouch curve	[Linear, Exponential, Logarithmic]	Sets the keyboard response curve for Aftertouch
	Velocity curve	[Linear, Exponential, Logarithmic]	Sets the keyboard response curve for Velocity
	Transport send	[Off, MMC, Real-time, Both]	Set whether the KSP sends Transport signals
	Transport Receive	[Off, MMC, Real-time, Both]	Set whether the KSP receives Transport signals
	Clock send	[OFF, ON]	Enable/Disable clock send
	Clock receive	[OFF, ON]	Enable/Disable clock receive

9.1.5.1. Knob Acceleration

There are four response curves for the encoders:

- **Slow (Off):** the encoders transmit every value. It takes more turns of an encoder to move from minimum to maximum. Use this when greater precision is desired.
- **Medium:** when turned quickly the encoders will skip a few values. It takes fewer turns of an encoder to move from minimum to maximum.
- **Fast:** when turned quickly the encoders will skip a few more values. It may take as few as 1-1/2 turns of an encoder to move from minimum to maximum.

9.1.5.2. Aftertouch curve

Linear, Exponential, Logarithmic are terms that describe the curve of the voltage that the keyboard will transmit when you exert pressure on a key you hold.

In Linear mode, it will transmit a steady voltage increase. In exponential mode, the voltage will double with each volt level. It rises fast and rolls off at the end. A Logarithmic curve is the inverse of Exponential, slow to start with a sharp rise at the end. When applied to control envelope shapes and VCAs it will create a specific character.

9.1.5.3. Velocity curve

By setting a velocity curve you determine the way a key will respond when you press it. See Aftertouch curve above for the characteristics of each curve.

9.1.5.4. Transport send

This setting allows you to set whether and how the KSP will transmit signals such as Stop, Rec and Play. It can either be OFF, MCC (the KSP will use the setting currently stored in the MCC) or use the current Real-Time setting.

9.1.5.5. Transport receive

This setting allows you to set whether and how the KSP will respond to transport command it receives over MIDI. It can either be OFF, MCC (the KSP will use the setting currently stored in the MCC) or use the current Real-Time setting.

9.1.5.6. Clock send

Set whether the KSP will transmit clock signal to external MIDI devices.

9.1.5.7. Clock receive

Set whether the KSP will receive a clock signal from external MIDI devices.

9.1.6. CV settings

CV settings		Values	Description
Voice 1.....4			
	Pitch Format	[1V/Oct (d) 1.2V/ Oct Hz/V]	Defines the voltage level the KSP will output at the CV out. 1V/Oct (eurorack and others), Hz/V or 1.2V/Oct (Buchla)
	Base Note	[C-2 (d) to G8]	Sets the base note of the keyboard
	Gate Format	[V Trig 5V (d), V Trig 1OV, S-Trig]	Defines the gate voltage level the KSP will output at the gate out
	Mod Type	[Velo (d), Pressure]	Determines which parameter will be sent out at the MOD output
	Mod Max Voltage	1-1O Volt	Sets a limit to the maximum voltage output of the Modulation type
	Pitch bend range	(1-24) semitones	Set maximum pitch bend range in semitones. Default = 2

This is where you select the electrical behaviour for each sequencer.

Drum Gates		Values	Description
	Gate 1...8 format	[V-Trig 5V (d), V-Trig 12V, S-Trig]	Set the trigger standard of the drum gates, V-Trig 5V being the default.

This is where you set the output voltage level of the drum gates. Different brands of Synths and Drum synths may require a specific voltage to trigger them properly.

9.1.7. Controller

Controller		Values	Description
	Global MIDI Channel	[1(d)-16]	
Knob 1.....5			
	CC	[0-127]	
	Port	[USB, MIDI 1, MIDI 2, All(d)]	
	Channel	[1-16, Global(d)]	
	Mode	[Absolute(d), Relative1, Relative2, Relative3]	
	Min	[O(d)-127]	
	Max	[O-127(d)]	

These parameters enable you to set up the KSP as a controller.

'Global MIDI channel' set the default MIDI channel on which the KSP will transmit.

The Knob (encoder) settings define the functionality of the five encoders. Each Encoder can have a different profile. Encoder 1 could transmit CC 9 on the second MIDI port on MIDI channel 5. Encoder 2 could transmit CC 19 on the first MIDI port on MIDI channel 6 with the range set to a minimum of 50 and a maximum value of 80.

9.1.8. Touch Strip

Touch Strip		Values	Description
	MIDI send/Receive	[OFF (d), Send, Receive, Both]	
	MIDI CC	[1-127], 9 (d)	

9.1.8.1. MIDI Send/Receive

Use this menu to specify whether the KeyStep Pro touch strip will send MIDI and react to incoming MIDI messages. The range of transmitted and recognized values is detailed in

9.1.8.2. MIDI CC

Use the value field to select the MIDI CC number the Touch Strip will use to transmit and receive.

9.1.8.3. Using the Touch Strip with a DAW

The activity on the touch strip can be recorded into a DAW when the MIDI Send/Receive parameter is enabled. It will send values for MIDI CC #9 by default, but you can select a different MIDI CC# as described above.

The touch strip will send only the following values:

Touch strip region	MIDI CC value
1/4	25
1/8	50
1/16	75
1/32	100
release value	0

However, if you draw a controller curve for the touch strip in your DAW the KeyStep Pro will respond to the values in the following way:

MIDI CC value received	Touch strip region selected
1-25	1/4
26-50	1/8
51-75	1/16
76-100	1/32

9.1.9. Drum Map

Drum Map		Values	Description
	Mode	Chromatic, Custom	
	Config	Chromatic Low note (1-103)	
		Custom note 1...24 (36-127)	

There are four options for the MIDI note assignments of the keys in Drum mode:

In the Mode menu, you can select whether you want to set your drum tracks notes mapped in a standard chromatic way or to create a custom mapping.

Config>Chromatic enables you to set the Chromatic Low note: it lets you set which note of the lower-key drum track will trigger. All keys above will be mapped from this note.

Config>Custom Notes: Enables you to link the 24 drum keys on the keyboard to a MIDI note number in the range 0 to 127. The default mapping starts at MIDI note 36.

Note: MIDI notes that are already used by another note are not displayed when navigating the list.

9.1.10. Misc

Misc		Values	Description
	Vegas Mode	[5min (d), 10min, never]	Set the start time of the VEGAS LED pattern.
	Screen Saver	[2min (d), 10min, 30min]	Set the start time the screen saver will kick in.
	Reset Factory	Confirm [Yes,No]	Restore factory settings
	Firmware version		Displays current Firmware version

9.2. MIDI Control Center

The manual for the MIDI Control Center has general descriptions of the features that are common to all Arturia products. To learn how to access the manual, click this link: Where to find the manual [p.125].

This chapter will cover only the MIDI Control Center features that are unique to the KeyStep Pro.

9.2.1. MCC Basics

The MIDI Control Center is an application that allows you to configure the MIDI settings of your KeyStep Pro. It works with most of Arturia's devices, so if you have an earlier version of the software you'll want to download the latest version. It will work with those products as well.

9.2.1.1. System requirements

PC: 2 GB RAM; CPU 2 GHz (Windows 7 or higher)

Mac: 2 GB RAM; CPU 2 GHz (OS X 10.8 or higher)

9.2.1.2. Installation and location

After downloading the appropriate MIDI Control Center installer for your computer from the Arturia website, double-click on the file. Then all you have to do is start the installer and follow the instructions. The process should be trouble-free.

The installer places the MIDI Control Center with the other Arturia applications you have. In Windows, check the Start menu. In Mac OS X, you'll find it inside the Applications/Arturia folder.

9.2.1.3. Connection

Connect KeyStep Pro to your computer using the included USB cable. It will go through its startup cycle and be ready when the display shows "Project 1".

Now launch the MIDI Control Center. KeyStep Pro will be in the list of connected devices.

Potential issues: Windows OS

The MIDI driver for the KeyStep Pro is not "multi-client". That's a technical term that simply means this: If a DAW application is already active on your computer, the MIDI Control Center will launch but KSP won't be detected properly. To use the MIDI Control Center to alter the parameters of your KeyStep Pro you will need to exit the DAW application.

Potential issues: Mac OS X

If the cable between your Mac and the KeyStep Pro is connected properly and the Mac is having trouble detecting the unit, your Mac is experiencing what is known as a "USB port enumeration issue." Here is one potential solution.

1. Launch the Audio MIDI Setup utility. The fastest way to do this is usually to hold the Command key, press the space bar, and type in the letters AMS.
2. If you do not see the MIDI Studio window, hold the Command key and press 2.
3. Turn the unit off or disconnect its USB cable. You should see the related device icon turn grey.
4. Select the greyed-out KeyStep Pro image and delete it.
5. The KeyStep Pro also might be labelled "MIDI Device" or something else, so you may need to delete all MIDI Device images and restart any connected devices. First, you must disconnect any units or turn them off, or else you will not be able to delete the icons.
6. Restart the KeyStep Pro. It should reappear in the MIDI Studio window.

9.2.1.4. Where to find the manual

There is a built-in help file for the MIDI Control Center in its Help menu, as shown below:
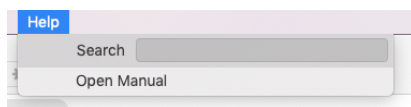
It's a good introduction to the MIDI Control Center, describing each section of the software window and defining important terms you will need to know while using the MIDI Control Center, such as 'Project Browser' and 'Template'.

Note: Once installed the MIDI control Center will update itself automagically. If for some reason you don't want that to happen, disable this option in the FILE menu.

The next chapter explains how to use the MIDI Control Center software to configure the KeyStep Pro presets so they match your system and enhance your workflow.

9.2.2. Device Projects

9.2.2.1. Project list

The left side of the MIDI Control Center window shows a list containing Projects 1-16. When one of the Projects is selected from the list the MIDI Control Center can recall that Project from the internal memory of the KeyStep Pro and place it into the User Project area in the Project Browser window. See the Store To/Recall From [p.128] section for instructions about this.

To see a larger number of the Projects in the Device Projects list, move your mouse pointer to the edge of the Device Projects window until it turns into a double arrow pointer, then click and drag the window resizing button.

9.3. Project Browser

The Project Browser shows a list of all the projects that have been archived using the MIDI Control Center. These are divided into two main groups of Templates: Factory and User.

The User Templates are the ones you have recalled from the KeyStep Pro using the MIDI Control Center. See Store To/Recall From [p.128] to learn how to do this.
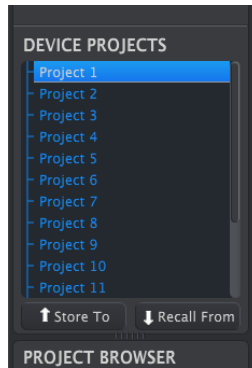
A Template in the MIDI Control Center is the same thing as a Project inside your KeyStep Pro: it contains the Project-level settings, the Control Mode settings (including the 16 Scenes), and the patterns from all four sequencers.

> ℹ️ User Templates: click +/- to expand or collapse Project view

9.3.1. Building a Project library

You can build a limitless library of Projects in the User Templates area. Simply drag one of the Projects to the Project Browser window and it will be transferred from the KeyStep Pro automatically. Then you can give it a new name if you like.

9.3.2. Revise a Template

If you'd like to modify a Template you can drag it from the Project Browser and drop it on one of the Projects in the Device Projects area. This will send the selected Project directly into the KeyStep Pro internal memory at that Project location.

> ℹ️: This process will **overwrite** the selected Project in the KeyStep Pro internal memory. Be sure to save what you were doing before you transfer the file!

9.3.3. Revise a pattern

If you'd like to modify a pattern inside an archived Template you can drag that pattern from the Project Browser and drop it onto one of the Projects in the Device Projects window. This will send the selected pattern directly into the KeyStep Pro.
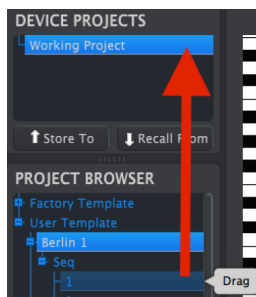
> ℹ !: When the MIDI Control Center sends a pattern to KeyStep Pro **it will overwrite the pattern** in that memory location. Be sure this is what you want to do before you transfer one of these files!

9.4. Store To/Recall From

These two buttons enable you to send and recall projects to and from the Keystep Pro.

> **i** Warning!: The Store To/Recall From transfers cannot be performed while the KeyStep Pro is running.

9.4.1. Store a Project to the KeyStep Pro

The upper left-hand section of the MIDI Control Center has a button called 'Store To'. Right above that is a list that allows you to specify which of the 16 Projects in the KeyStep Pro internal memory will receive the User Project you have selected.

> **i** !: When you follow the steps below you will overwrite the current Project that resides inside the KeyStep Pro. Be sure this is what you want to do! If not, please store it to another location inside the KeyStep Pro.

We'll assume that Project Berlin1 is available for this example:
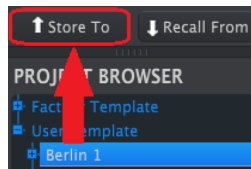
1. First, select 'Project Berlin1'? in the list as pictured above.
2. Select the User Project you would like to store into the KeyStep Pro.
3. Click the Store To button at the bottom of that section.

That's all there is to it! The settings and sequences of the User Project have been stored as Project Berlin1 in the KeyStep Pro. Now you can load that Project whenever you want by using the PROJECT button and Step button 2.

9.4.2. Recall a Project from the KeyStep Pro

It is possible to make whole Projects without a computer attached. It is, however, good practice to back them up from time to time. Just grab any one of the internal Projects or patterns directly from the internal memory and store it as a Template in the Project Browser window of the MIDI Control Center.
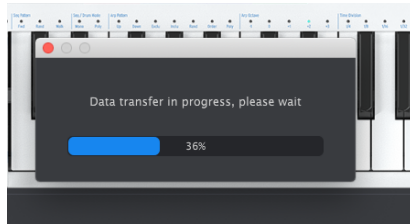
For example, if you want to back up Project #1 from the internal memory, simply select it in the Device Projects window and click Recall From. Project #1 will show up in the Project Browser with a time/date stamp as a name. You can rename it if you like.

9.4.3. Template Utilities

Important features such as Save, Save As, Delete, Import, and Export have been documented in the MIDI Control Center manual, which you will find in the software Help menu. Look in that document for the section titled Template Utilities.

9.5. Controller MAP window

In the Controller Map Window, you set the individual values of encoders and buttons on a per Project basis.

Here are some examples of what you can do

- Set Knob Acceleration, Aftertouch and Velocity curves and transport modes.
- Assign an encoder to control any MIDI CC# and define its operational range.

9.6. Device Settings

The right side of the MIDI Control Center window contains essential parameters you can use to optimize KeyStep Pro for your setup and your working style. You will need to scroll down to see them all.

Device settings can be saved and recalled. It is a handy feature that enables you to quickly change the configuration of your KeyStep Pro. Several applications come to mind:

- Redirect the output of the Tracks to synths connected to other MIDI channels

- Change the CV/Gate setting to switch between eurorack standard to the Buchla CV standard in a mixed setup

- Quickly load and an alternate set of values for the Encoders, this would enable you to control a different set of parameters on external synths and set predefined control ranges
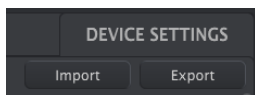
The settings you see here are the same as in the Utility menu on the KeyStep Pro. These setting are linked to a Project; each project can have its configuration settings.

For an overview of what these settings do please refer to the Utility Menu section [p.116].

9.6.1. Midi Channel
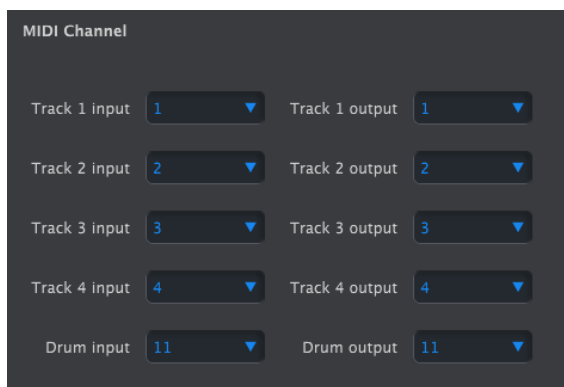
In this menu, you set the channels on which the four tracks will send and receive MIDI signals. The Tracks default to their track number, the Drum channel defaults to channel 10.

9.6.2. Sync
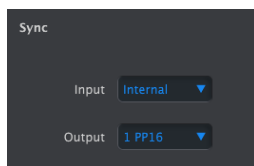
These settings allow you to specify the input- and output response to various synchronization and tempo options. By changing these settings you determine which clocking signal will be transmitted and recognized by the Clock input and output connectors.

9.6.3. Metronome
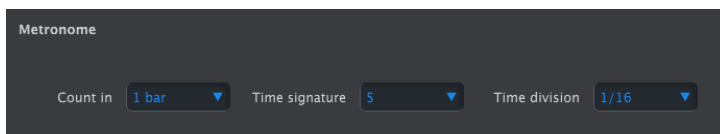
To use the Metronome activate it with SHIFT + Tap Tempo/Metronome. The default time signature is 4/4. For example, to set the time signature to 5/8 set Time-division to 8 and Time signature to 5.

9.6.4. Launch Quantize
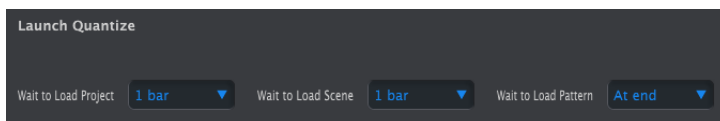
In this menu, you 'tell' the Keystep Pro how it should continue to the next Pattern, Chain or Scene. Should it wait for 1 bar, 2 bars or 4 bar to make the switch? This is useful in live performance settings where you may not want to interrupt the flow of the music between Projects.

If the Sequencers and the Drum pattern are of different lengths the KeyStep Pro will wait until the end of the Drum pattern before loading the next Project Scene or Pattern.

9.6.5. MIDI Settings
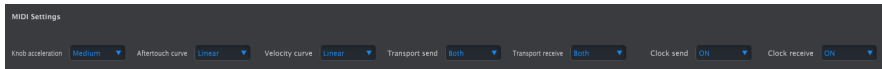
9.6.5.1. Knob Acceleration

There are four response curves for the encoders:

- **Slow (Off):** the encoders transmit every value. It takes more turns of an encoder to move from minimum to maximum. Use this when greater precision is desired.
- **Medium:** when turned quickly the encoders will skip a few values. It takes fewer turns of an encoder to move from minimum to maximum.
- **Fast:** when turned quickly the encoders will skip a few more values. It may take as few as 1-1/2 turns of an encoder to move from minimum to maximum.

9.6.5.2. Aftertouch curve

Linear, Exponential, Logarithmic are terms that describe the curve of the voltage that the keyboard will transmit when you exert pressure on a key you hold.

In Linear mode, it will transmit a steady voltage increase. In exponential mode, the voltage will double with each volt level. It rises fast and rolls off at the end. A Logarithmic curve is the inverse of Exponential, slow to start with a sharp rise at the end. When applied to control envelope shapes and VCAs it will create a specific character.

9.6.5.3. Velocity curve

By setting a velocity curve you determine the way a key will respond when you press it. See Aftertouch curve above for the characteristics of each curve.

9.6.5.4. Transport send

This setting allows you to set whether and how the KSP will transmit signals such as Stop, Rec and Play. It can either be OFF, MCC (the KSP will use the setting currently stored in the MCC) or use the current Real-Time setting.

9.6.5.5. Transport receive

This setting allows you to set whether and how the KSP will respond to transport command it receives over MIDI. It can either be OFF, MCC (the KSP will use the setting currently stored in the MCC) or use the current Real-Time setting.

9.6.5.6. Clock send

Set whether the KSP will transmit clock signal to external MIDI devices.

9.6.5.7. Clock receive

Set whether the KSP will receive a clock signal from external MIDI devices.

9.6.6. CV Gate Settings

This is where you select the electrical behaviour for each sequencer.

9.6.7. Controller

These parameters enable you to set up the KeyStep Pro as a controller.

'Global MIDI channel' set the default MIDI channel on which the KeyStep Pro will transmit.

The Knob (encoder) settings define the functionality of the five encoders. Each Encoder can have a different profile. Encoder 1 could transmit CC 9 on the second MIDI port on MIDI channel 5. Encoder 2 could transmit CC 19 on the first MIDI port on MIDI channel 6 with the range set to a minimum of 50 and a maximum value of 80.

9.6.8. Touch Strip
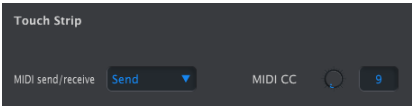
9.6.8.1. MIDI Send/Receive

Use this menu to specify whether the KeyStep Pro touch strip will send MIDI and react to incoming MIDI messages. The range of transmitted and recognized values is detailed in Using the Touch Strip with a DAW [p.122].

9.6.8.2. MIDI CC

Use the value field to select the MIDI CC number the Touch Strip will use to transmit and receive.

9.6.8.3. Using the Touch Strip with a DAW

The activity on the touch strip can be recorded into a DAW when the MIDI Send/Receive parameter is enabled. It will send values for MIDI CC #9 by default, but you can select a different MIDI CC# as described above.

The touch strip will send only the following values:

Touch strip region	MIDI CC value
1/4	25
1/8	50
1/16	75
1/32	100
release value	0

However, if you draw a controller curve for the touch strip in your DAW the KeyStep Pro will respond to the values in the following way:

MIDI CC value received	Touch strip region selected
1-25	1/4
26-50	1/8
51-75	1/16
76-100	1/32

9.6.9. Drum map
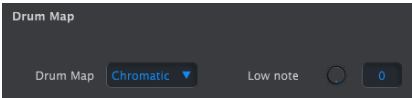
There are four options for the MIDI note assignments of the keys in Drum mode:

In the Mode menu, you can select whether you want to set your drum tracks notes mapped in a standard chromatic way or to create a custom mapping.

Config>Chromatic enables you to set the Chromatic Low note: it lets you set which note of the lower-key drum track will trigger. All keys above will be mapped from this note.

Config>Custom Notes: Enables you to link the 24 drum keys on the keyboard to a MIDI note number in the range 0 to 127. The default mapping starts at MIDI note 36.

Note: MIDI notes that are already used by another note are not displayed when navigating the list.

9.6.10. Misc
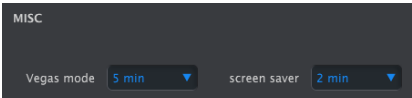
| Misc		Values	Description
	Vegas Mode	[5min (d), 10min, never]	Set the start time of the VEGAS LED pattern.
	Screen Saver	[2min (d), 10min, 30min]	Set the start time the screen saver will kick in.
	Reset Factory	Confirm [Yes,No]	Restore factory settings
	Firmware version		Displays current Firmware version

10. KEYSTEP PRO AND YOUR MODULAR SYSTEM

In 1996 Dieter Doepfer created a case based on the 19-inch rack format which was (and still is) a common format to store effects units and other studio gear. He also set the standard for the power supply and the bus boards in which you plug your modules. It was to become the standard of what we now know as Eurorack.

After a slow start his Eurorack format quickly gained momentum: the modules were low cost and very compact. In the years to follow the number of available modules grew exponentially. This phenomenal growth is easy to understand: as a musician/sound-designer you can now create your own customised instrument.

Modular systems have gained a tremendous populairity in recent years. It's easy to understand why: it give gives you a very direct hands-on experience of sculpting sound. Literally hands-on because youn need to turn real knobs and make real connections using patch cables. By doing this physically somehow the connection you have with the sound that emerges is more immideate. It enables you to create a unique individual sound. Whether it's EDM or complex Ambient music, you'll find Eurorack modules to match your music style.

The KeyStep Pro is a marvelous Eurorack controller because of its four analog voice outputs and its rich sequencer and arpeggio architecture. The Voices output analog signal levels that perfectly match you eurorack gear. Becasue the output of the voices can be configured in various ways you can create highly complex and original signal paths and create music no one has ever heard before.

The KeyStep Pro is also an ideal controller for your RackBrute. Its compact size makes it a perfect addition to your RackBrute when travelling or performing. Pitch, Velocity, and Gate signals of the sequencers are available for control of Eurorack modules. The eight Drum Gates can be connected to one of the many available Eurorack drum modules, or you can use the gate signals to trigger any combination of modules.
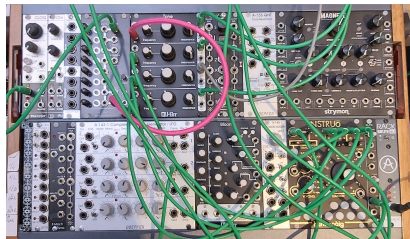
Another interesting use of the KeyStep Pro is to use it as the master clock of your RackBrute system. To make this possible the KeyStep Pro has a Clock Output. The Clock input allows you to connect the KeyStep Pro to a clock module on your RackBrute. This sets the Keystep Pro in Slave Mode.

In the past decade, Arturia spearheaded the revival of the analogue synthesizer with some very advanced products such as the MicroBrute, the MiniBrute and the magnificent MatrixBrute.

With each new product generation, Arturia added interface options that made it easier to connect its product range to a modular rack. In recent years the BeatStep Pro has become the controller of choice for many musicians in the Modular world because it features Gate, Pitch and Velocity outputs you can use to control external oscillators. In addition, it has eight Drum gate outs that you can use to trigger Eurorack drum modules.

We Arturia hope that the Keystep Pro will become the controller for keyboard-oriented musicians and composers. In many areas, the Keystep Pro is more advanced than the Beatstep Pro.

The RackBrute attaches to the MiniBrute 2 and MiniBrute 2S but can also be used as a standalone unit. As such you can use it with all Arturia controllers such as the KeyStep Pro that feature Gate, Pitch, and Velocity outputs.

The KeyStep Pro is an ideal controller for your RackBrute. Its compact size makes it a perfect addition to your RackBrute when travelling or performing. Pitch, Velocity, and Gate signals of all sequencers, the arpeggiators and the drum track, are available for control of Eurorack modules. The eight Drum Gates can be connected to one of the many available Eurorack drum modules, or you can use the gate signals to trigger any combination of modules.

Another interesting use of the KeyStep Pro is to use it as the master clock of your RackBrute system. To make this possible the KeyStep Pro has a Clock Output. A smart solution is to connect the Clock output of the Keystep Pro to a clock divider. A clock diver will divide the Tempo of the Keystep Pro in half and further down. You can then use these timing signal to start events on a beat, every two beats or on a bar.

The Clock input allows you to slave the KeyStep Pro to a clock module on your RackBrute. It will accept Start/Stop/Continue message from eurorack sequencers. The Launch Quantize option in Utility allows you to start Scenes, Projects, and Patterns in a synchronized way.

10.1. The Modular adventure

As soon as you start filling your case with modules, you'll be faced with an endless stream of questions: What kind of modules do I need? Why are certain modules so popular? Do I go for a standard setup with analogue oscillators, or is it better to go digital? West Coast synthesis or East Coast synthesis?

The answers to these question come slowly: by reading forums online, comparing user experiences and most importantly, by diving in. And if you're not happy with the choices you make; there's a thriving secondhand market for used Eurorack modules where you can sell your modules if they don't deliver what you expect.

Whatever you do, take the time to get to know the modules you currently own inside out. It will help you to avoid a situation where you sit in front of your system tweaking knobs randomly, without understanding what's happening, but hoping that something magical will happen. This a certain recipe for losing interest very fast. To sustain the fascination you feel, learn the functions of a module one by one and test your knowledge continuously. It's the only way to experience the reward that comes with be able to create the sounds as you imagine them.

10.2. Hardware or Software?

Eurorack gear can be expensive, it's tempting to spend lots of money on gear you will rarely use. No wonder some people refer to Eurorack as Eurocrack. There's an alternative; VCVRACK a free software alternative for Euoroack. It enables you experiment with modules. Many hardware modules also exist in the form of a VCVRACK module. In the examples below we'll use VCVRACK modules as a hardware alternative.

10.3. Using MIDI to control Modules on VCVRACK

Another option is to control MIDI-enabled software on your computer. In the example below, we'll use the arpeggiator of the Keystep Pro to control an oscillator on VCVRACK a free virtual Modular system you can download from https://vcvrack.com](https://vcvrack.com/))

- Connect the USB output on your Keystep Pro to a USB port on your computer.

- Open VCVRACK. It will open a demo which is perfect for our example.

- In the first position, you see a MIDI-CV module. We'll use this module to get Note values from the Keystep Pro and use those to control the pitch of VCVRACK oscillator and the and Velocity values to control the ADSR.

- Click on "computer keyboard" in the MIDI-CV module and change the value to "Core MIDI". Click on "no device" and change it to Arturia Keystep Pro". We've now set up the MIDI-CV module to receive pitch en velocity values from the Keystep Pro.

- Now click in the Audio-8 module on "no device" and select the output of your system.
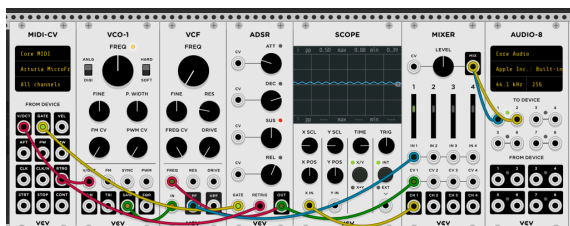
When pressing a key on the Keystep Pro you should now hear sound from VCVRACK. Congratulations you can now use the Keystep Pro keyboard, the arpeggiator and sequencer to control Oscillator(s) and Envelope generator(s) in VCVRACK.

10.3.1. Keystep Control mode and VCVRACK

As seen previously CC# values can be used to control parameters on external synths and modular systems. These control codes differ from the note related MIDI messages. CC# codes are specifically designed to control parameters on an external MIDI device, on a Modular hardware system or a software Modular system such as VCV Rack.

10.3.1.1. Sending CC# codes from the Keystep Pro

To send CC# codes to external devices the KeyStep Pro has to be in Control Mode.

The moment you press the Control Button the 5 encoders take on a different role; they will transmit CC# codes over MIDI.

Here's an overview of the default CC# values the Keystep Pro over MIDI.

Encoder /Strip	CC value
Pitch	74
Gate	75
Velocity	76
Time Shift	77
Randomness	78
Pitch Bend	1
Control strip	9

In this second tutorial, we'll link the Encoders of the Keystep Pro to control the Envelope in the demo patch of VCVRACK. This tutorial assumes you have things patched as at the end of Tutorial two: the Keystep Pro controls VCO-1 and the ADSR on VCVRACK.

- In VCVRACK, click somewhere in empty space in the rack. The "module select" window will open. Type "midi" in the search window and select the MIDI-CC module

- In the MIDI CC module, click where it says "no device" and select "Arturia Keystep Pro " from the drop-down menu.

- You now have 16 CC# controllers numbered from O to 15 available to link parameters from the Keystep Pro to a parameter on VCVRACK. Below the connection field, you'll see 16 patch points that relate to the entries in the connection field.

- Click on the "O", the first entry in the connection field, the zero will turn into a dash.

- Move the Pitch Encoder on the Keystep Pro, the MIDI-CC module will now display "74" in the first field, this happens to be the CC# number of the Pitch encoder on the Keystep Pro.

Repeat this for the Gate (75) in the second entry of the connection field, Velocity (76) and Time Shift (77) Encoders.

Now connect:

- the first patch point on the MIDI-CC module to the CV input of the Attack of the ADSR,
- the second patch point to the CV input of the Decay of the ADSR
- the third patch point to the CV input of the Sustain of the ADSR
- and the fourth patch point to the CV input of the Release of the ADSR.

That's it: you have linked the Encoders to the ADSR of VCVRACK.

Whatever changes you make on the KeyStep Pro will be mirrored on VCVRACK. To hear the effect, press the ARP button the Keystep Pro, play a chord and wriggle the KSP encoders.

You may have guessed by now that the MIDI-CC module of VCVRACK is a very useful tool to figure out what CC# codes are currently being send by the encoders. Just click on one of the 16 fields and move an encoder on the Keystep Pro; its CC# number will be displayed by the MIDI-CC module.

The CC# values is the table above are default values. If for reason you need them to transmit other CC# values because you want to control parameters of a synth that will only respond to a certain value, go to Utility>Controller>Knob1>CC to change the value that Encoder 1 transmits. The same of course applies to the other knobs.

Note: These values can also be changes in the MIDI control Center.

Sending CC# values works both ways, you can use the output of VCRACK, a sequencer or any other module on your Modular system to control parameters on your Keystep Pro. To control the Keystep Pro from your Modular system you need a module such as the BEFACO VCMC to translate the analogue signals of your Modular system to MIDI CC# format.

Note: As with Note and Velocity values, CC# codes operate in the range 0-127

10.4. CV/Gate functions

KeyStep Pro provides direct access to some of the best music technology the world has produced in the last six decades: USB, MIDI, Clock and CV/Gate connectors are all present on its rear panel in a space not much larger than a pencil.

Connection diagrams for each of these interfaces are available in Making the Connections [p.14].

In this chapter, we'll focus on the features of the Keystep Pro CV/Gate circuitry. Refer to the MIDI Control Center [p.124] chapter for in-depth coverage of the MIDI features available.

10.5. SEQ1-SEQ4: Pitch, Velo and Gate

When one of the sequencers is selected the notes you play on the keyboard are translated immediately into Control Voltage (CV) and Gate signals and sent to the connectors on the back panel. Three independent voltages are sent for each note: Pitch, Velocity/Aftertouch, and Gate open/close.

The sequencers record what you play, and then you can use the encoders to edit the pitch, velocity and gate time (duration) of each note. When sequences playback they send those signals to the attached devices through the CV/Gate connectors. ?GB? does not work

10.6. Routing signals

For each Track, you can decide on which Voice output it will play. By default Track 1 will use Voice one, Track 2 Voice 2, Track 3 Voice 3, Track 4 Voice 4.

Hold SHIFT and press one or a combination of the CV routing keys. This will make the current track playing on these voices. You can repeat this action for the other three Track. Switching Track which active the Voice outputs you've assigned to this track.

image

When you try to assign a voice to a track that is already in use by another track this will overwrite the active assignment and replace it with the new assignment you make.

While creating assignment watching the LEDs can be helpful. Voices already assigned to the current track will be lit in full. To cancel that assign hit the corresponding key. Voice assigned to other tracks will be dimmed.

10.6.0.1. Voice allocation

What happens if you send two notes to a voice output when the oscillator connected to that voice output can only play one note at a time? Unlike humans who get confused when having to do several things simultaneously the voice output knows exactly what to do: the last note you played will have priority. Every new note you play will "kill" the previous one. If you play two notes the last one you press will be heard. If you play more than two keys, it's always the last key you'll hear.

How does this work when you're playing a sequence and have more than one note stored in a step? The voice output port will solve this be playing only the lowest note of the chord stored in the step.

The KeyStep Pro has another trick upon its sleeve; let's say you have a sequence playing back in track one with lots of 4 note chords in each step and you assign the output of Track one to Voice 1, Voice 2, Voice 3, and Voice 4. What will happen? The Keystep Pro will applaud your idea and distribute the notes in your step over the four voice outputs!

If you have more than 4 notes in a step the KeyStep Pro will steal voices to solve that problem; with five notes in a chord, the first note in the chord will be dropped, sacrificed to play the fifth note. With six notes the first two will be dropped...you get the idea.

Typically the Pitch (CV) output is connected to a Voltage Controlled Oscillator (VCO), the Gate output is connected to a trigger input or a Voltage Controlled Amplifier (VCA), and the Velo output is connected to a VCA or a Voltage Controlled Filter (VCF) or both through a splitter or a patch bay. Those routings will produce the most predictable results. But you can send those signals to any parameter that will accept them.

10.6.1. Shift Magic

All of the SHIFT functions will work their magic on the CV outputs: Nudge will nudge your sequence, semi up and semi down will transpose your sequences within the current scale.

The Keyboard shift functions will also work on the CV outputs! You can change Sequence Direction, change the Time Division, Scale and Root Note and set a user scale.

CV Routing

For the Modular environment the last four SHIFT functions are the most important ones. They enable you to setup the routing of the CV signals. By default, the output of Track one will be send to Voice one, the output of Track two to Voice two etc.

To define CV routing, hold SHIFT and press one of the last four Keys, marked CV Routing 1-4. You can send the output of a track to one or multiple voices. If you would want to send the output of Track 1 to voices 1 and 2, hold SHIFT and press CV routings 1 and 2. In a similar way you can deactive an active routing by pressing the routing keys once more. This will free up this routing for another track. .The active CV voices will be shown with the LED colors of the tracks to which they are assigned.

The voices of the currently selected track will be fully lit . Those of other tracks will be dimmed. If you select a CV voice that is used by another track, it will remove its assignation from the previous track.

10.6.2. CV/Gate signals: DAW configuration

It's possible to use the KSP as a MIDI to CV converter; you can send note data from MIDI tracks on your DAW to the Keystep Pro CV/Gate jacks. When the MIDI channels match, the MIDI data will appear in analog form as control voltage at the CV/Gate output.

There are two things to keep in mind though:

- All CV/Gate jacks are monophonic, so if the selected MIDI track on the DAW contains polyphonic data, playback could be extremely unpredictable. It's best to send only one note at a time to the CV/Gate jacks.
- CV/Gate jacks can send only basic signals: pitch, Velocity/Aftertouch and note on/off. In other words, the Keystep Pro encoders aren't able to control synthesizer parameters through the CV/Gate jacks, for example. You can, however, control external synths via MIDI, the encoders send CC# codes when you turn. What's more, in Control mode every sequencer can send CC# codes stored in its tracks.

10.6.3. CV/Gate specifications

Some analog synthesizers have unusual implementations that are not fully compatible with the Keystep Pro CV/Gate signals. Please refer to their specifications before making a purchase so you can be sure the two devices will work together well.

We've designed the Keystep Pro to be as flexible as possible, though: the MIDI Control Center [p.124] allows you to configure the response of the CV/Gate jacks in a number of ways. As an alternative you can change these setting in Utility>CV>Voice.

These are the electrical signals that can be sent by the Keystep Pro CV and Gate jacks:

- Control Voltage (Pitch) has two options:

    ◦ 1 Volt/Octave (O-1OV) (Standard Eurorack Format)
        ▪ O Volt MIDI note range: O-127 (Volt/octave)
    ◦ 1. 2 Volt/Octave (O-1OV) (Buchla Format)
        ▪ O Volt MIDI note range: O-127 (Volt/octave)
    ◦ Hertz per Volt
        ▪ 1 Volt MIDI note range: O-127 (Hz/Volt)

- Gate output has two options:

    ◦ V-trigger (positive or "voltage"), trigger voltage is between 1OV and 12 V
    ◦ V-trigger (positive or "voltage"), trigger voltage is between 4V and 5V
    ◦ S-trigger (negative, or short?)

In addition you can set Modulation type Modulation Range and Pitch Bend ange. For an overview of these settings please refer to Chapter 9 [p.116]

The MIDI Control Center [p.124] and Utility allow each of these settings to be configured independently for each of the voices.

1O.7. Drum Gates

When DRUM is selected the notes you play on the lower two octaves of the keyboard are translated immediately into Gate signals and sent to the Drum Gate connectors on the back panel. Two voltages are sent for each note: one for Gate open and one for Gate close. Velocity/Aftertouch information is not sent.

The Drum sequencer can record what you play on the lower two octaves of the keyboard and then you can use the encoders to change the gate time (duration) of each note. When the sequence plays back it will send those signals to the attached devices through the Drum Gate connectors, just like the pads would.

However, the keys can't 'play'? the Drum Gate connectors while the unit is in Control Mode. You can start the sequencers, though, and they will play the attached devices while you control your DAW and play your MIDI devices from Control Mode.

1O.7.1. Which keys do I use?

The lowest eight keys of the keyboard are mapped to the eight DRUM channels which corresponds to the Drum Gate numbers on the rear panel. These are the keys to play when you want to send trigger signals to an external device.

1O.7.2. Can my DAW send Drum Gate signals?

It's possible to send triggers from up to eight MIDI tracks on your DAW to the Drum Gate jacks. There's a MIDI note number assignment for each Drum Gate, and you can set those values using the MIDI Control Center [p.124] and in Utility>Drum Map

When the MIDI channel and the note numbers match, the Drum Gates will be triggered.

> **Note**: The Drum Gate jacks can send only one type of signal: note on and note off. So even though the Drum pattern holds Velocity/Aftertouch data for all 16 pads, the Drum Gates are only intended to trigger sounds and shut them off.

10.7.3. How should I route the signals?

Typically the Drum Gate output is connected to a Voltage Controlled Amplifier (VCA). But you can send those signals to any parameters that will accept them.

For example, they can be used to trigger a synthesizer such as one from our MiniBrute or MicroBrute series.

10.7.4. Drum Gate specifications

Drum modules and other devices with Gate input connections have different requirements for the type of signal they will recognize.

Fortunately, we've designed the Keystep Pro Drum Gate jacks to operate as either a V-trigger or an S-trigger . These settings will work with the vast majority of the devices you will encounter.

Please refer to the specifications of other devices before connecting them to the Keystep Pro so you can know how to make them work properly together.

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