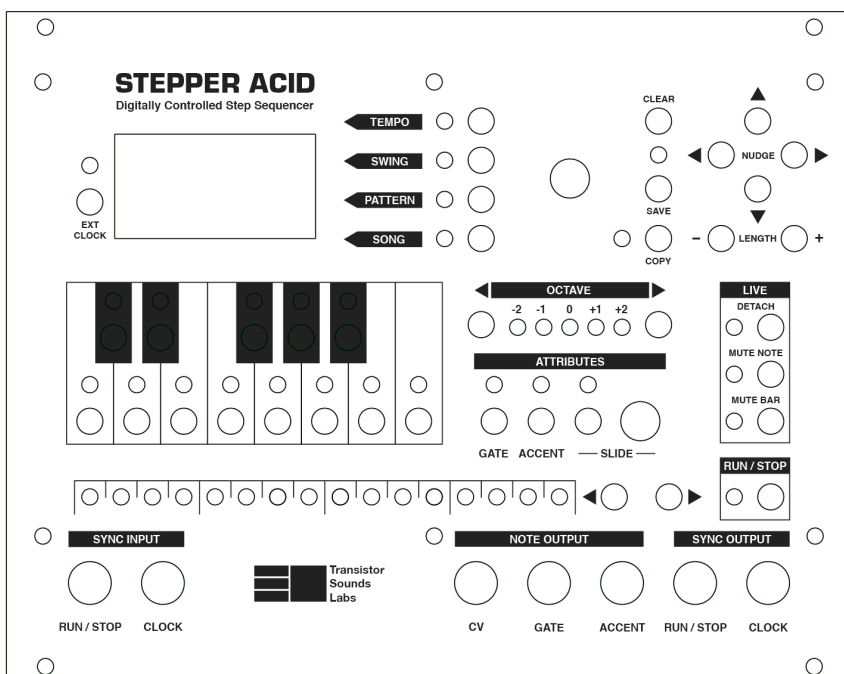# STEPPER ACID

Digitally Controlled Step Sequencer

# Owner's Manual

Model: SA-100

Introduction

Thank you for purchasing Stepper Acid! Please take some time to read this manual as it will help you to explore Stepper Acid's features. We hope you have as much fun making music with it as we do.

Installation

Like all Eurorack modules, Stepper Acid gets its power from a standard Doepfer A-100 bus board or equivalent. The red edge of the ribbon cable goes at the bottom, where it connects to the -12V part of the bus. If in doubt, follow the cable along and check the text printed on both the Stepper Acid board and the bus board. Both should clearly say where +12V, GND and -12V are.

By default, the gate and accent outputs are 5V. If your system requires 12V gate and accent signals, then simply move the jumper on the smaller SA-100-S board so that the middle pin is connected to the 12V pin instead of the 5V pin. If you're not sure what voltage your system requires for its gate and accent signals, 5V is probably fine. The run/stop and clock pulse signals are always sent out at 5V, regardless of the jumper setting.

Once you've plugged Stepper Acid into the bus board, screwed it into place and turned your modular on, you're ready to wire up a patch. The first thing to do is connect its CV (1V/Oct pitch) and gate outputs to a bus access module, or directly to an oscillator and envelope generator. Then you're ready to start playing on the little keyboard.
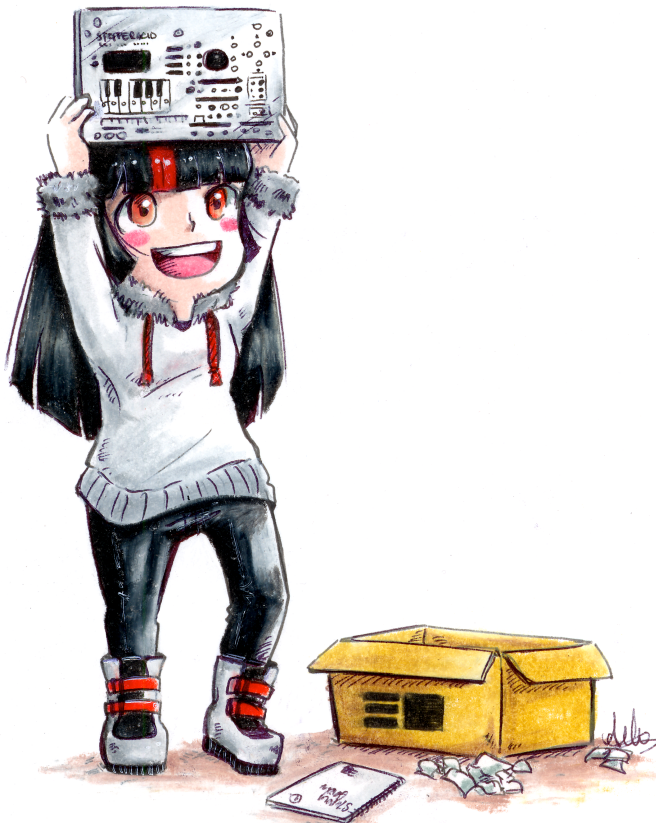
First Steps

Each note you enter can have a gate signal (so you can hear it), an accent (so your neighbours can too), and a slide. You can also use the octave buttons to make the pitch higher or lower. After entering each note, use the **forward ▶** button (near to the **RUN/STOP** button) to move onto the next one. Similarly, you can go back to the previous note using the **back ◀** button.

It usually helps to stick to a particular musical key, so we've included some handy charts in the appendix of this manual.

To hear your beautiful creation, press the **RUN/STOP** button.

Bear in mind that rests have pitches and can have accents and slides, just like regular notes. This is a feature intended for creative exploitation. For example, you can slide from a rest into a note. If you don't want to use this feature, make sure all rests repeat their previous note's pitch and accent, so that you don't hear these change during a long release.

Patterns

The basics of editing a pattern are covered in the **First Steps** section above.

You can also edit a pattern while it is playing. If you press a note, attribute or octave button during the first half of a note playing, then the current note will change to the new one. If you press it during the *last* half of a note playing, then the next note will change, and you'll hear the result almost immediately – quantised, of course.

If you hold down a note while playing then each step will be filled with that note. This can be a useful melodic starting point.

The **"E"** displayed in pattern mode means that you're *editing* that pattern. You can browse different patterns using the dial. When the sequencer is stopped, browsing a different pattern automatically selects it for editing.

When the sequencer is running, the **"E"** for *editing* changes to **"P"** for *playing*. Now when you browse other patterns using the dial, you're only looking at them, not selecting them. To select a different pattern to play, dial in the pattern you'd like to switch to, and press the **PATTERN** button again. This *primes* the pattern, queuing it up. The **pattern light** will flash, and at the end of the bar, the sequencer will switch to playing this new pattern instead, giving it the **"P"** symbol.

Each pattern can be anywhere between one and sixteen steps in length. You can change the pattern length using the **+** and **-** length buttons.

There are a total of 40 patterns for you to fill.

Nudge

When we make patterns, we sometimes belatedly realise that the downbeat isn't where we expect, or that it would sound better in a different key. So we made the nudge buttons to let you nudge the notes back and forth, and up and down.

Time

Press the **nudge ◄** button to shift the whole pattern to the left by one step, and **nudge ►** to shift it to the right. This also works in song mode, where it shifts the whole song left and right by one pattern.

Transpose

Press the **nudge ▲** button to transpose the pattern up a semitone, and the **nudge ▼** button to transpose down a semitone. You can also hold down these buttons to transpose quicker. Transposing all the notes will only work until the highest or lowest note has been reached.

Utilities

Copy and Paste

To copy a pattern, first browse or edit it, then press the **COPY** button. The **copy light** lights up to remind you that there's a pattern ready to be copied. Then browse over to the pattern you want to overwrite and press it again. The pattern is overwritten, and the **copy light** goes back off. If you change your mind about wanting to copy the pattern, simply copy it onto itself. You can tell which pattern you're copying from as it has **"C"** written next to it.

Save and Clear

When you make a change to a pattern, the **clear/save light** lights up to remind you that you have unsaved changes. You can either save your changes using the **SAVE** button, or revert them to the last saved state using the **CLEAR** button.

When your pattern has no unsaved changes (to put it another way, when the **clear/save light** is off), the **CLEAR** button erases it. Pressing it again will undo this erasure, bringing the saved pattern back.

The Song

Up to sixteen patterns can be chained together to make a song. In song mode, the **back ◄** and **forward ►** buttons select the pattern slot to change, and the dial changes which pattern is stored in that slot. The song length can be anywhere between one and sixteen patterns, adjusted with the **+** and **-** buttons.

Live

Stepper Acid was designed with live performance in mind, so most of its features can be used while it's playing. In addition, we designed a special *detached* mode that makes live playing even better.

As you might expect, **MUTE NOTE** toggles whether Stepper Acid is muted, starting on the next note, whereas **MUTE BAR** toggles whether it's muted starting on the next bar, for a smoother transition.

Detached Mode

Now this is where it gets interesting!

Put simply, the detach function lets you keep one pattern (or the song) playing while you go about step sequencing another pattern, or preparing a chain of patterns in song mode.

It works by *detaching* the read head and write head, so that what you're editing isn't what you're listening to. In pattern mode, this means you can edit one part of the pattern while the other part's playing, and you can edit a different pattern entirely to the one playing. Similarly, in song mode, you can edit a different pattern slot to the one currently being played. You can even wander off from pattern mode to song mode or vice versa, without affecting playback. This allows you to modify your music while it's playing, to slowly evolve it while listening to it. We've found this simple difference makes the process much more intuitive and fun.

SAVE, **CLEAR** and **COPY** also work in detach mode, so you can copy a pattern to a new slot and edit it, all while the original is still playing. When you have finished preparing the new pattern, you can press the **detach** button again to reattach the heads, then you can switch to the new one seamlessly.
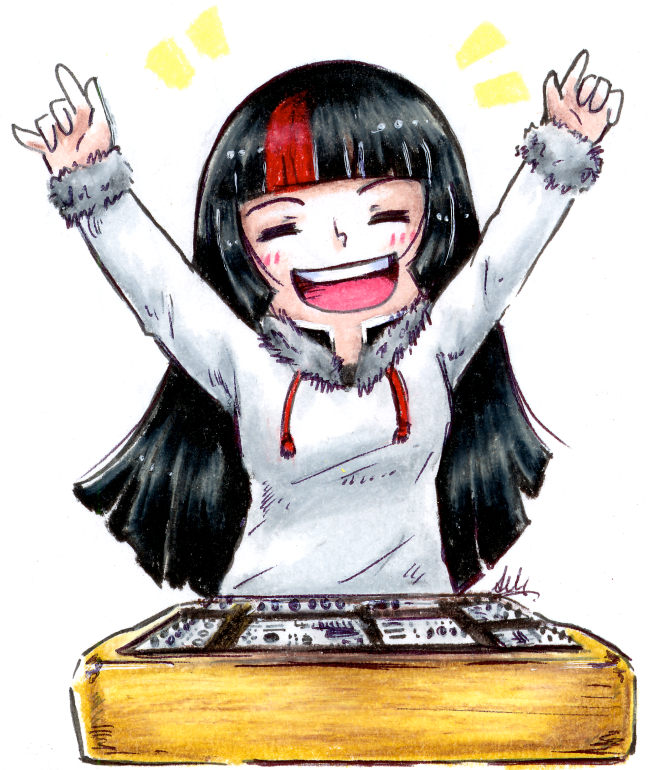
Clocks

Internal Clock

Stepper Acid has its own built-in clock that it uses to keep time. As with most old school sequencers, this constantly ticks regardless of whether the sequencer is running or not. You can set the tempo to anywhere from 30BPM to 320BPM.

External Clock

If you'd prefer, you can instead let Stepper Acid synchronise to another clock by pressing the **EXT CLOCK** button. In this mode, you don't control the tempo via Stepper Acid. Instead, you can control the clock resolution, measured in pulses per quarter note, or PPQN for short. The display will show the resolution instead of the tempo, and will display a lower case **"c"** for *clock resolution* to indicate this.

The clock resolution says how many clock ticks are needed to measure four steps. Different sequencers use different PPQN values, so you may need to experiment to get them to play nicely together. For example, Roland's TR-606 and TR-808 drum machines use 24 pulses per quarter note. Some sequencers use 48 or 96. Most modular sequencers use 4 (one pulse per step). We've also provided various other values in between, which to our knowledge aren't used by anything. You can use these, along with careful setting of pattern lengths, to create polyrhythmic music.

The clock resolution is universal, so changing it also changes the internal clock. This affects both the output clock signal and swing, as described below.

Swing

In general, there are two ways of implementing swing: you can either apply swing to the clock signal itself, or you can creatively ignore and pay attention to particular steady clock ticks in order to apply swing after the clock signal. Stepper Acid only does the latter. If you can swing another sequencer's clock and hook that up to Stepper Acid, great. Stepper Acid will relay and use it. If not, it can groove to its own swing while generating or faithfully relaying steady clock ticks. This has the added bonus of allowing different instruments playing together to have different amounts of swing at the same time.

Stepper Acid's swing is dependent on the clock resolution. The higher the resolution, the smoother the transition to and from maximum swing. So for a really nice segue into swinging and back again, or for a choice of more subtle swinging, try increasing the resolution.

If you use Stepper Acid's internal clock, its own clock pulses and run/stop signal are sent out of its **SYNC OUTPUT** jacks. If you use an external clock, Stepper Acid passes these along instead. This allows you to chain together as many Stepper Acids as you'd like, to make heavily layered music.

If you have an external clock source but no run/stop signal, don't worry. We have you covered. You can still use the run/stop button with an external clock. Using this button, you can force a low run/stop signal to go high, but you can't force a high run/stop signal to go low.

Tips and Tricks

If you make a pattern with an odd number of rows and apply swing, it alternates which notes are elongated, sounding like two different patterns.

By setting one Stepper Acid to 24PPQN and making a 16 step pattern, and another to 32PPQN and making a 12 step pattern, you can create polyrhythmic music. By keeping the PPQNs the same as each other and using different pattern lengths, you can create polymetric music. Naturally, this also works when synchronising to a DAW using a MIDI to CV converter.

Here are some fun things you can do with Stepper Acid besides making great acidlines:

• Play the mini keyboard live (especially useful for sampling single notes)

• Use the CV output as a tempo-synced LFO with arbitrary waveform

• Trigger drums with the gate and accent out (and, at a pinch, the CV out, by alternating very high and very low notes)

• Turn all the notes on and use the gate output as a 24PPQN (or 48 or 96) to 4PPQN converter

Service Notes

This should only be carried out by those familiar with electronics.

It's possible that over time (or if the unit is subject to vibration) the DAC reference may drift from its desired voltage. If this happens, it's possible to calibrate the voltage using a calibrated multimeter and precision slot screwdriver.

On the smaller of the two circuit boards, there are two special calibration pads. Next to those, you'll find a multi-turn trimmer potentiometer (the small blue oblong with the small screw in the top).

With the module powered, and the multimeter set to Volts, put the positive red probe on the pad marked **"CAL 5.333V"** and the common black probe on the pad marked **"GND"**. Space is tight, so be *very* careful not to short out the leads!

The reference voltage should be 5.333V. This can be fine tuned by turning the screw.

This is best done as slowly as possible, as it can take a short time for the reading to settle.

Appendix

Key Charts

Major Keys

Key						
C	D	E	F	G	A	B
D♭	E♭	F	G♭	A♭	B♭	C
D	E	F♯	G	A	B	C♯
E♭	F	G	A♭	B♭	C	D
E	F♯	G♯	A	B	C♯	D♯
F	G	A	B♭	C	D	E
F♯	G♯	A♯	B	C♯	D♯	E♯ (F)
G	A	B	C	D	E	F♯
A♭	B♭	C	D♭	E♭	F	G
A	B	C♯	D	E	F♯	G♯
B♭	C	D	E♭	F	G	A
B	C♯	D♯	E	F♯	G♯	A♯

Minor Keys

Key						
C	D	E♭	F	G	A♭	B♭
C♯	D♯	E	F♯	G♯	A	B
D	E	F	G	A	B♭	C
D♯	E♯ (F)	F♯	G♯	A♯	B	C♯
E	F♯	G	A	B	C	D
F	G	A♭	B♭	C	D♭	E♭
F♯	G♯	A	B	C♯	D	E
G	A	B♭	C	D	E♭	F
G♯	A♯	B	C♯	D♯	E	F♯
A	B	C	D	E	F	G
B♭	C	D♭	E♭	F	G♭	A♭
B	C♯	D	E	F♯	G	A