INTRODUCTION

Sequencers, sequential switches, counters, analogue shift registers… Modular synthesisers provide a wealth of creative sequential functions for controlling and processing signals. Choosing which of these to include in a system can be a bewildering task.

Except when you don't have to choose. Step 8 represents a new type of modular building block: a sequential tracking/sampling register, which can be configured to provide any of these functions, and many more.

At its heart lies an analogue 1-to-8 signal switch feeding an octet of high-stability track/sample-and-hold stages. Each of these has its own analogue output with an attenuation slider, in addition to a gate output. LEDs visualise the status of each stage in real time. The switch can be controlled sequentially using the built-in 8-step counter, or addressed directly by an analogue control voltage (CV).

Numerous advanced circuit techniques are used to avoid the issues that often plague analogue switching and memory modules. The result: totally transparent signal paths with low noise, distortion and voltage 'droop', yet high bandwidth and precision.

Add to this the ability to 'mute' the inactive stages, pause the counter, reset it, change its direction or even shift the stages on each step, and the possibilities quickly become near-endless. A scanning output takes things even further, particularly making sequencer or addressed voltage source use easy and intuitive.

For those who are feeling adventurous, there are always more applications to try: configurable voltage mapper, hocketing controller, clock divider, graphic waveshaper, multi-output analogue downsampler… Discover a new world of sequential synthesis with Step 8.

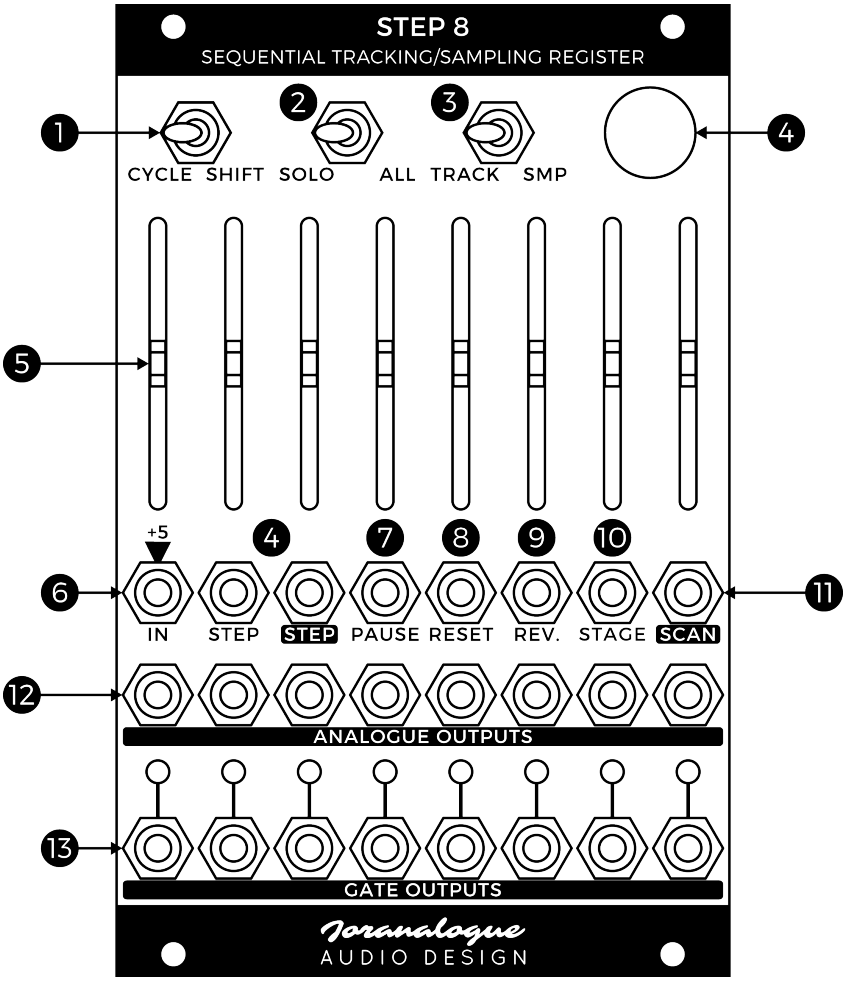
CONTENTS

In the Step 8 box, you'll find:

- Product card, stating serial number and production batch.
- 16-to-10-pin Eurorack power cable.
- Mounting hardware: two black M3 x 6 mm hex screws, two black nylon washers and a hex key.
- The Step 8 module itself, in a protective cotton bag.

If any of these items are missing, please contact your dealer or support@joranalogue.com.

CONTROLS & CONNECTIONS



1 CYCLE/SHIFT SWITCH

The cycle/shift switch determines Step 8's basic operational mode. In cycle mode, the module functions much like a sequential switch: the input signal is passed to each output stage in turn. Once a stage is no longer selected however, it will hold its voltage, unlike a basic sequential switch.

Shift mode configures the circuit as an analogue shift register: the input signal is always passed to the leftmost stage. During a step event, each stage will shift its voltage to its righthand neighbour.

2 SOLO/ALL SWITCH

When this switch is in solo mode, only the selected analogue output will be active. The other outputs will be 'muted', remaining at 0 V. This is especially useful when using the module as a sequential switch, as it may not always be desirable for the inactive stages to hold their voltages, as is the case in all mode.

3 TRACK/SAMPLE SWITCH

The track/sample switch determines how the selected stage responds to changing input voltage. Either the output simply follows the input signal at all times (tracking), or the input voltage is sampled once the stage becomes active, and held thereafter (sampling).

Step 8 can thus function either as a track-and-hold or sample-and-hold register. The low distortion, high bandwidth and high sampling speed (50 µs acquisition time) makes it suitable for audio use, while the low leakage rate also allows minutes-long storage of pitch-accurate control voltages (CVs).

4 STEP BUTTON, TRIGGER INPUT AND OUTPUT

Pushing the step button or applying a rising edge to the step input will advance the register by one step (when the address CV input is not in use). If the module is set to sample mode, a step trigger will also result in a sample being taken.

The input is typically connected to a rhythmic 'clock' signal, setting the tempo of a full patch. A step trigger output is provided as well, generating a 1 ms, +5 V pulse for every step. This signal can be used to synchronise Step 8 with other modules, without any latency. While this pulse width limits the trigger output frequency to 1 kHz, the module can be clocked at up to 60 kHz internally, for audio-rate processing.

Step 8's step, pause, reset and reverse inputs are uniquely designed to be driven reliably even from weak, slow, bipolar signals. They feature Schmitt action, with a +2 V low and +3 V high logic threshold.

5 STAGE SLIDERS

These sliders control the output level for each stage, ranging from fully off to unity gain. The LEDs on the levers visualise the positive output voltages in real time, although negative voltages can be processed as well.

6 SIGNAL INPUT

Connect your analogue input signal here. When this socket is not in use, the input voltage will come from an internal precision +5 V source.

Whenever Step 8 is powered on, the module preloads the input voltage into all stages. For many applications, this avoids the need to first manually step through the stages whenever the Eurorack system it's part of is restarted, before the patch works as expected.

7 PAUSE GATE INPUT

Step triggers no longer advance the register while this input is high. However, the selected stage's output voltage will still be updated when the module is configured in sample mode. This allows for independent stepping and sampling.

8 RESET TRIGGER INPUT

A rising edge applied to the reset input causes the register to immediately return to the leftmost stage. This can be used to ensure the module's 'first step' coincides with other modules or external control.

The reset feature may also be used to shorten the number of stages, anywhere from 1 to 7. Take the gate output of the stage just to the right of the desired final stage, and connect it to this input.

9 REVERSE GATE INPUT

A gate signal applied to this input causes the step direction to reverse, going from right to left rather than left to right.

10 STAGE INPUT

The stage input can be used to directly address any desired stage using an external control voltage, overriding the step, pause, reset and reverse functions. The stages are distributed evenly over a 0 to +5 V range.

Note that step triggers are still required to update the selected stage's output voltage when the module is configured in sample mode. This allows for independent stepping and sampling.

11 SCAN OUTPUT

The output voltage of the currently active stage is always available from this socket. This makes it easy to use Step 8 as a sequencer, among other applications.

12 ANALOGUE OUTPUTS

Each stage has its own accurate, impedance-compensated signal output.

13 GATE OUTPUTS AND LEDS

Once a stage is selected, the corresponding gate output will go high (+5 V), as indicated by the associated LED.

PATCH IDEAS

TOGGLING SIGNAL MUTER/ATTENUATOR

Taking advantage of its sequential nature, Step 8 can be used to toggle a signal on or off. Configure the module in tracking cycle mode. Set the odd stage sliders fully on, and the even ones fully off. Patch the signal into the input and use the scan output. On each step trigger or button press, the signal will toggle.

Change the slider settings for attenuation rather than hard on/off.

CLOCK DIVIDER

This patch idea is similar to the toggling signal muter/attenuator, except no input signal is used. In this case, the scan output will toggle between 0 V and +5 V for each step. In other words, the step frequency is divided by 2.

To divide by 4, configure the sliders on and off in 4 identical pairs. Division by 8 is possible as well, by setting the left half on and the right half off. This technique can be used for clock signals, as well as at audio rates.

ROTATING SHIFT REGISTER

Rather than the final stage shifting into oblivion, it is possible to keep the analogue shift register going perpetually. With the module set in sampling shift mode, simply patch the final analogue output into the input. On each step, the first stage will now sample the last one, keeping the analogue data in an endless loop.

PROGRAMMABLE VOLTAGE BANK

Without the input socket used, set all sliders to different positions and apply a variable CV to the stage input. This voltage will select between any of the eight programmed 0 to +5 V levels, with the result available from the scan output. Use the solo/all switch to whether the voltages are always available from the individual analogue outputs, or only when the appropriate stage is selected. This patch can be thought of as a fully configurable 8-level quantiser or voltage mapper.

SPECIFICATIONS

Module format
Doepfer A-100 'Eurorack' compatible module
3 U, 16 HP, 35 mm deep (inc. power cable)
Milled 2 mm aluminium front panel with non-erasable graphics

Maximum current draw
+12 V: 110 mA
–12 V: 45 mA

Power protection
Reverse polarity (MOSFET)

I/O impedance
All inputs: 100 kΩ
Analogue outputs: 0 Ω (impedance comp.)
Gate outputs: 1 kΩ

Outer dimensions (H x W x D)
128.5 x 80.9 x 52 mm

Mass
Module: 220 g
Including packaging and accessories: 295 g

SUPPORT

As all Joranalogue Audio Design products, Step 8 is designed, manufactured and tested with the highest standards, to provide the performance and reliability music professionals expect.

In case your module isn't functioning as it should, make sure to check your Eurorack power supply and all connections first.

If the problem persists, contact your dealer or send an email to support@joranalogue.com. Please mention your serial number, which can be found on the product card or on the module's rear side.

With compliments to the following fine people,
who helped to make Step 8 a reality!

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AUDIO DESIGN

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