stepStation
trigStation

user manual

Introduction

Thank you for choosing to use sickozell plugin modules, designed and created specifically for the VCV Rack eurorack simulator platform.

trigStation and stepStation are two trig/step sequencer povided with 8 independent trackseach up to 16 steps, these are the main features:

- configurable User Inputs and User Knobs (U1 U2)
- different advance mode types (MOD)
- ability to delay step advance up to 5 samples each track (Steps Delay).

I wish you the best possible experience with the sickozell modules, and for that reason you will be able to contact me directly by email at *sickozell@sickozell.org* if you encounter any problems, bug reporting, or for any suggestions.

Fabio Sickozell

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1. GLOBAL CONTROLS

1.1 CLOCK

The steps advance by means of an internal main clock that can be activated with the ON button, or by receiving an external clock on CLK input that can be pulse or CV. With the right mouse button on the CLK port you can directly choose the type of clock.

Internal clock activation can be also CV controlled. It needs a HIGH gate to be on. It shares the global RUN setting to be Gate or Trig (see below).

The main clock is repeated on the CLK OUT port, which can also be configured as a pulse or CV clock

When the internal clock is active, the external clock is automatically disabled if present.

1.2 GLOBAL RUN

The RUN button, enables or disables all tracks to receive clock signals for step advancement.

A gate or trigger can also be used to control the RUN button depending on the global settings.

Each track can ignore the RUN button state with a specific "exclude from Run" track setting.

1.3 GLOBAL RESET

The RST button or a trigger on its input, resets the sequences of all tracks and the internal clock if enabled, sending a 1ms trig on the dedicated RST output.

The internal clock reset can be disabled from the global settings menu.

Each track can ignore global resets with a specific "exclude from Rst" track setting.

1.4 PROGRAMS

Up to 32 programs can be stored in which all the track and global settings are recorded.

To store the current configuration on the program previously selected with the PROG knob, simply double click on the STOR button, which remains lit for about 1 second to confirm storage.

Moving the PROG knob scrolls through the various programs and the SET button flashes.

The various programs can also be selected via CV (range 0-10v) or via a trigger on the input, which will advance to the next program up to the last one stored, after which it starts again from P0. A special option in the global settings allows you to choose whether the input port will receive CV or trigger.

The selected program is not effective until the SET button is pressed, unless the AUTO button has been turned on, which automatically sets the selected program.

The RECL button, or a trigger on its input, restores the selected program, erasing any unstored changes.

Furthermore, if the RECL button has not been set to AUTO, it allows you to cancel the program selection, returning the sequencer to the state prior to program selection..

2. TRACKS

Each track has an auxiliary clock input that is pulse-only and replaces the main clock.

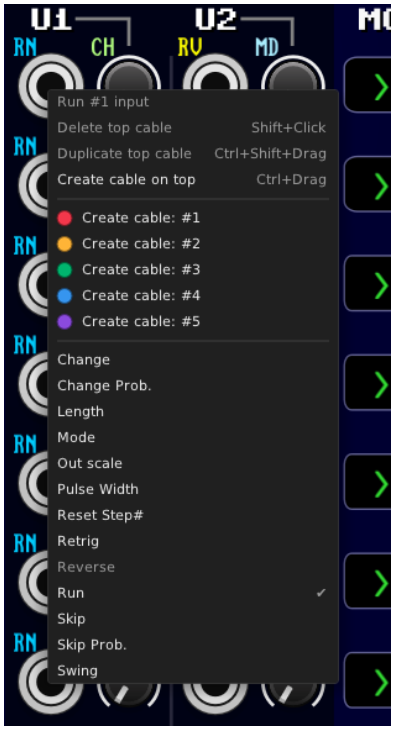
You can divide or multiply the clock received on each track using the DIV/MULT knob or clicking/right-clicking on the DIV/MULT display.

The RST input resets the track sequence

The LEN knob sets the length of the sequence up to 16 steps

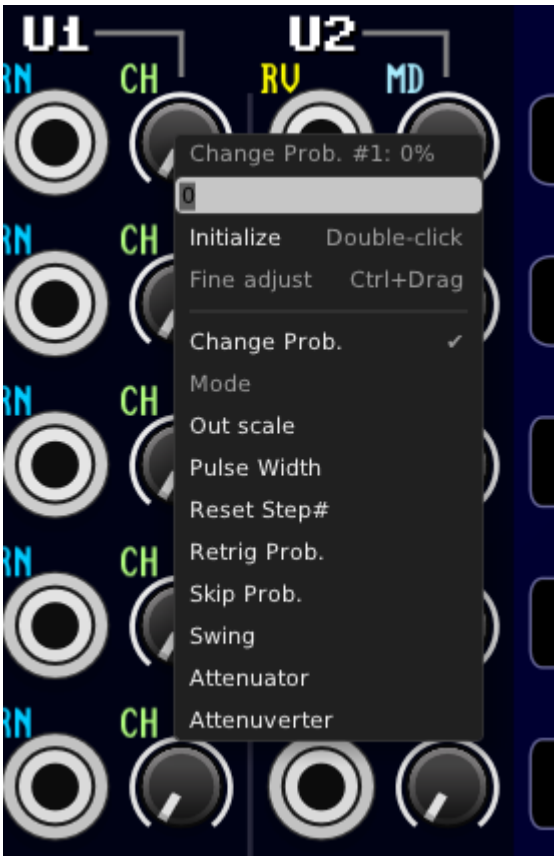
The U1/U2 inputs and knobs are configurable using the right-click on each of the User Controls, or via the track menu (see below) or from the general context menu.

The available INPUT types are:



- IN CHANGE): if the gate is HIGH when the step is advanced, the step is inverted on trigStation, on stepStation i twill change to a random value in the track range setting
- IN CHANGE PROB: a CV 0-10v sets the probability with which the step is randomized. If there is a user IN CHANGE in the track this input is ignored
- IN LENGTH: the length of the sequence is set from 1 to 16 steps using CV 0-10v
- IN MODE: the advance mode is set using CV 0-10v (>>, <<, PingPong, |PingPong|, Rev, RAND, RNDr)
- IN OUTSCALE: this is the attenuator at the output. The attenuation percentage is set using CV 0-10v.
- IN PULSE WIDTH (stepStation only): the pulse width is set using a CV 0-10v from 0-99%
- IN RESET STEP#: a CV 0-10v sets the initial step after a reset
- IN RETRIG: when the sequencer advances, if the gate is HIGH the track remains only the same step. In the case of trigStation, the trigger will also be played
- IN REVERSE: when the sequencer advances, if the gate is HIGH the direction of the advance is reversed. Active only for the modes >>, <<, PINGPONG, |PINGPONG|
- IN RUN: when a cable is connected, the sequencer advances only if the gate is HIGH
- IN SKIP (trigStation only): if the gate is HIGH when the step advances, the step value is ignored and will not be passed to the output (skipped)
- IN SKIP PROB: using CV 0-10v you set the probability with which the step is ignored. If there is an IN SKIP user control in the track, this input is ignored
- IN SWING: a CV 0-10v sets the amount of swing. This feature is enabled only on clock multiplications. If it is not possible to apply the swing, it is indicated on the label with an asterisk (SW*)

The available KNOB types are:



- KNOB CHANGE PROBABILITY: sets the probability that the step will be reversed when the sequencer advances. If used in conjunction with the FLIP input. The probability that the step will be reversed is only considered if the gate on the FLIP input is HIGH
- KNOB MODE: selects the sequencer advance mode (>>, <<, PingPong, |PingPong|, Rev, RAND, RNDr)
- KNOB OUTSCALE: sets the attenuation percentage on the track output
- KNOB PULSE WIDTH (stepStation only): sets the pulse width percentage from 0 to 99%
- KNOB RESET STEP#: sets the initial step after a reset
- KNOB RETRIG PROBABILITY: sets the probability of remaining on the same step when the sequencer advances. If used together with IN RETRIG the probability is calculated only if IN RETIRG is HIGH
- - KNOB SKIP PROBABILITY (trigStation only): sets the probability with which the step value is ignored
- KNOB SWING: sets the swing percentage. This feature is enabled only on clock multiplications from x2 and up. If it is not possible to apply the swing it is indicated on the label with an asterisk (SW*)
- KNOB ATTENUATOR, KNOB ATTENUVERTER: perform the attenuation/inversion of the input signal on the relative port. It is active only on the LENGTH, MODE, OUTSCALE, PULSE WIDTH, RESET STEP#, SKIP PROB, SWING inputs,

The Pulse Width control is incompatible with Swing, so if both are present, Pulse Width will be ignored. In this case an asterisk (PW*) is added to the PW label of the user control.

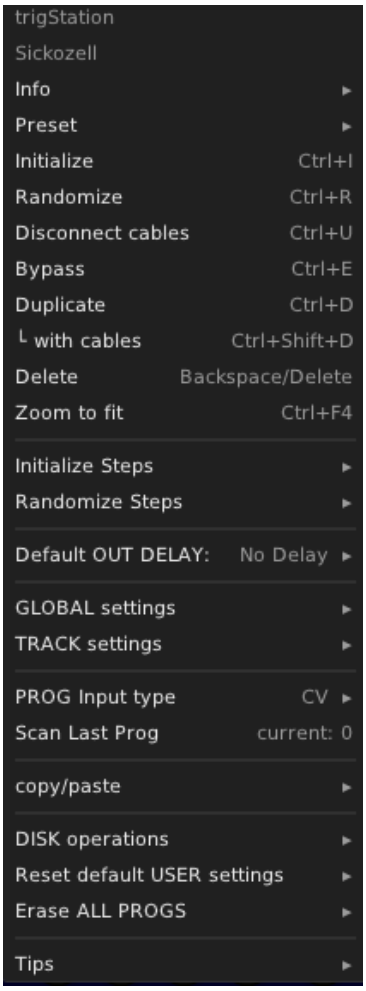
2.1 Advance Modes (MOD)

Advance modes can be controlled via the KNOB MODE and/or IN MODE, or by clicking/Rclicking directly on the mode display, or by using the right button of the track controls.

These are the possible modes:

- " >> " : forward
- " << " : backward
- " PP " : ping pong
- " |PP| " : like ping pong, but the first and last step are repeated.
- " RAND " : when the sequencer advances, the step is random. If the IN REV input is HIGH, the step is the next one
- " RNDr " : the sequencer normally advances forward, the stepnumber is only randomized if the IN REV input is HIGH
- " CV " : the step number is always calculated on the voltage (range 0-10v) present on the CLK input of the track

3. GENERAL CONTEXT MENU



The general context menu has the following items:

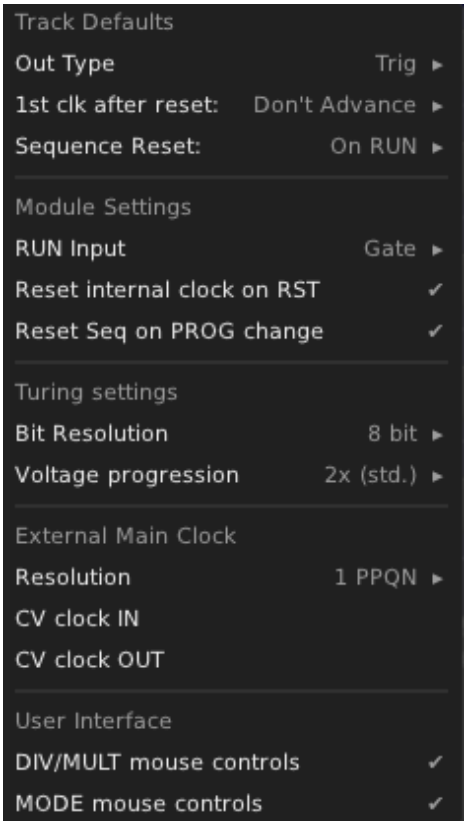
- - Initialize Steps: initializes all steps or only those of a specific track. On stepStation the knobs are all initialized to 0 depending on the track range (see below)
- Randomize Steps: randomizes all steps or only those of a specific track
- Knobs Range (stepStation only): this sets the range of every single step knob
- Default Out Delay (see below)
- GLOBAL Settings: set the default settings for the tracks (see below) and the general module settings
- TRACK Settings: settings of each individual track and any exceptions to the global defaults
- PROG Input Type:
  a) CV: a voltage in the range 0-10v selects the desired program,
  b) TRIG: a trigger on PROG INPUT selects the next program up to the last recorded, after which it restarts from P0
- Scan Last Prog: searches for the last stored program
- copy/paste: allows you to copy and paste an entire panel, the U1/U2 User settings U1/U2, all sequences, the sequences of each individual track
- DISK operations: saves and loads various types of presets, even from

other sequencer modules

- Reset default user settings: recalls the default settings for all U1/U2
- ERASE ALL PROGS: erases all programs, restoring them to factory settings
- Tips: shows some quick tip about the module

3.1 GLOBAL SETTINGS

The GLOBAL settings menu has the following items:



a) Track Defaults:

- Out Type (solo trigStation): Trig / Gate
- 1st clck after Reset: Don't Advance (default), Advance
- Sequence Reset: No Reset, On RUN(default), on STOP. Resets the sequences when RUN button changes to on, off, or no reset.

b) Module Settings

- RUN input: Gate (default), Trig
- Reset internal clock on RST: it resets the internal clock when a global reset is detected
- Reset Seq on PROG change: it resets the sequences when a program is changed

c) Turing settings (trigStation only, see below)

d) External Main Clock

- Resolution: this sets the PPQN resolution on the main external clock
- CV clock IN: this sets the main external clock input to CV
- CV clock OUT: this sets the external clock output to CV

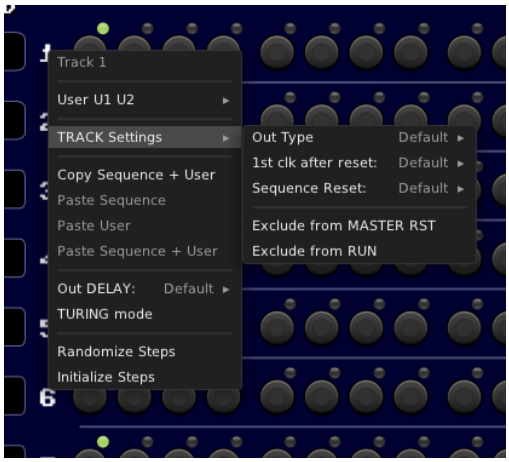
e) User Interface

- DIV/MULT mouse controls: enables mouse buttons to change DIV/MULT setting
- MODE mouse controls: enables mouse buttons to change MODE setting

4. TRACK MENU

The track menus are available by right-clicking in the number track area of each track.

You can directly set the advance mode, TURING mode (trigStation only), set the User Input and User Knob, custom track settings, track Steps Delay, copy and paste the sequence and randomize the steps.



4.1 TURING MODE (trigStation only)

When a track is set to TURING MODE, the track number turns yellow and the output voltage (in the range 0-10v) is calculated on the quantity and position of the various steps, working like a “fixed” Turing Machine.

It is therefore possible to set an OUTSCALE U1/U2 to attenuate its value, or even set a FLIP to randomize the individual steps as they advance, just like a real Turing Machine.

The voltage is calculated by assigning a fixed and progressive voltage to each of the 8 steps preceding the current one. The sum of the voltages assigned to each step, if turned on, determines the output voltage, so 8 steps turned on will give 10v, all 8 steps turned off will give 0 volts.

In the Global Settings menu you can change the bit resolution (8 or 16bit) or the progression type (2x standard, 1.3x, Fibonacci)

5. OUT DELAY

This feature allows you to delay up to 5 samples the output of each individual track.

Only the track outputs are delayed, the clock output is always without a delay.

Setting up properly different Out Delay is possible to easy modulate the inputs of a track with the output of another track, maintaining correct synchronization.

In practice, it involves setting the Out Delay on the track to be modulated that is one sample greater than the Out Delay of the modulating track.

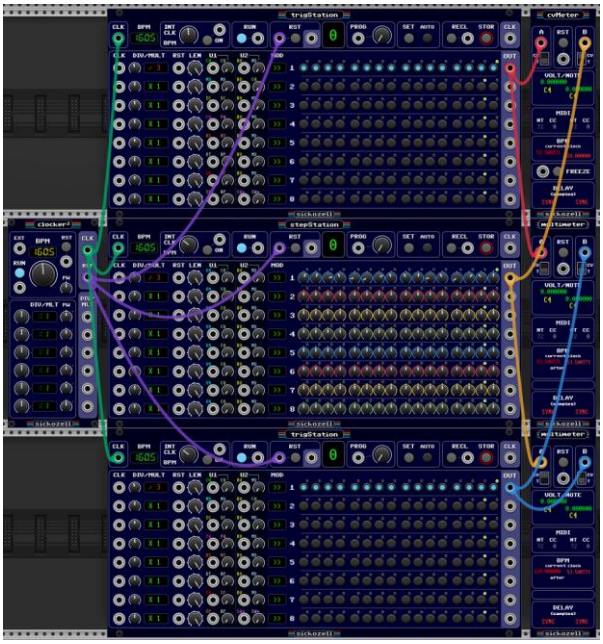
In this example, a Default Out Delay of “1 sample” has been set, and track 2 has been individually set to “No Delay”. This way, each individual step on track 2 sets the attenuation of the output of track 1.

6. Synchronization

There are several ways to control synchronization between multiple stepStations and trigStations (hereinafter Stations) or with other clock source modules.

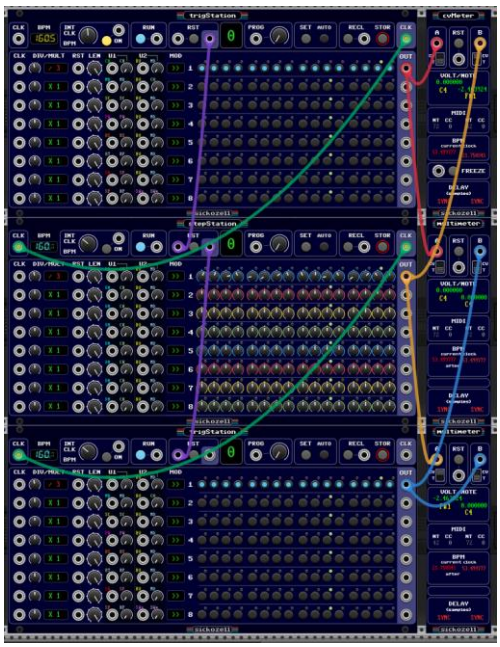
To help with synchronization, it can be useful to use the cvMeter module to measure the distance in samples of the outputs of different Stations, taking care to set the switch to 'T' (trig) if you are measuring a signal coming from trigStation. The indicator at the bottom will indicate synchronization by displaying "SYNC" or the number of samples of delay of that source. In some cases during use cvMeter can get confused, especially if you connect/disconnect cables or change the types of inputs: simply press the Reset button on cvMeter..

- **Multiple stations controlled by clocker2 (PARALLEL):**
  Connecting multiple stations in parallel to a clock source 'clocker2' is the easiest way to have all the modules in sync. No Station has the internal clock activated and all have a Default Out Delay of zero (No Delay).



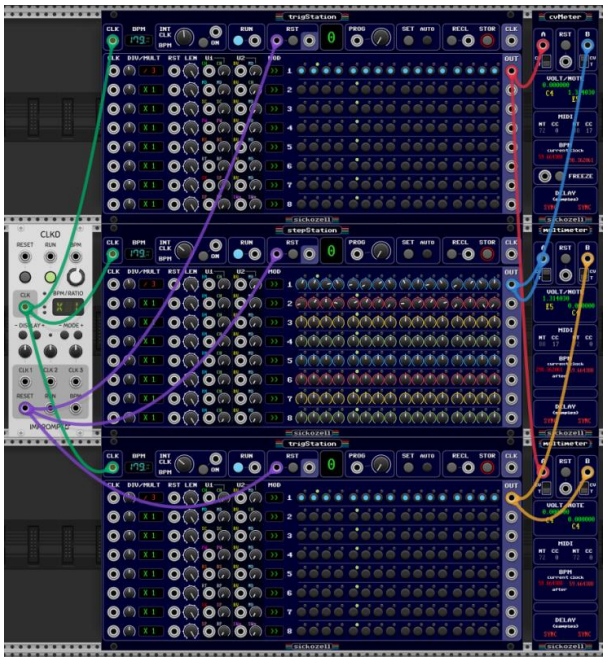
- **Multiple Stations connected (PARALLEL):**
  When connecting multiple Stations in parallel, only the first one will have the internal clock activated. The Clock Out must be connected to the Clock In of the other Stations, as well as the Out of the Global Reset. Only the first station will have the default Out Delay at 1 and the others at 0 (No Delay). For connecting the clocks it is preferable to use the CV clock option, but even the pulse clock maintains correct synchrony, even for tracks with clock divisions or multiplications.

- **Multiple Stations connected (SERIES):**
  When connecting multiple Stations in series, only the first one will have the internal clock activated. Each Clock Out must be connected to the Clock In of the next Station, as well as the Out of the Global Reset. The last station will have a default Out Delay of zero (No Delay) and going up the chain each module will have the Default Out Delay increased by 1. For connecting the clocks it is preferable to use the CV clock option, but even the pulse clock maintains correct synchronization, even for tracks with clock divisions or multiplications.



- **Multiple Stations connected to a third-party Master Clock:**
  Other pulse clock sources can be connected to the Clock In. Clock divisions and multiplications can be done internally. All stations are set with Default Out Delay to 0 (No Delay).

  You can decide not to use a general external clock and feed each individual track from an externally generated clock or division/multiplication, but without using the internal one, which would almost certainly lead to loss of synchronization between the various tracks.



In this example, track 1, which receives a clock multiplied by 5, then internally divided by 5 (theoretically unchanged clock), is not in sync with track 2 which is working with the global external clock.

7. CREDITS

SickoCV is the name of the plugin project for the VCV Rack platform that groups together all modules created by Sickozell, including stepStation and trigStation.

SickoCV is open source and distributed under the GPL-3.0-or-later license. It's available for free on gitHub and on the official VCV Rack library.

Some of the graphic components of the SickoCV modules are © VCV under creative commons license CC BY-NC-4.0

Impromptu's CLKD by MarcBoule (https://github.com/MarcBoule/ImpromptuModular/?tab=License-2-ov-file) under a Creative Commons Attribution-Share Alike 4.0 License.

Sickozell would like to thank Andrew Belt and all the VCV Rack staff for creating and making this platform available, open source and free of charge.

Best thanks to all the entire VCV Rack forum community for their help in the development of these plugins.

A big thank to Omri Cohen for his teachings and support.