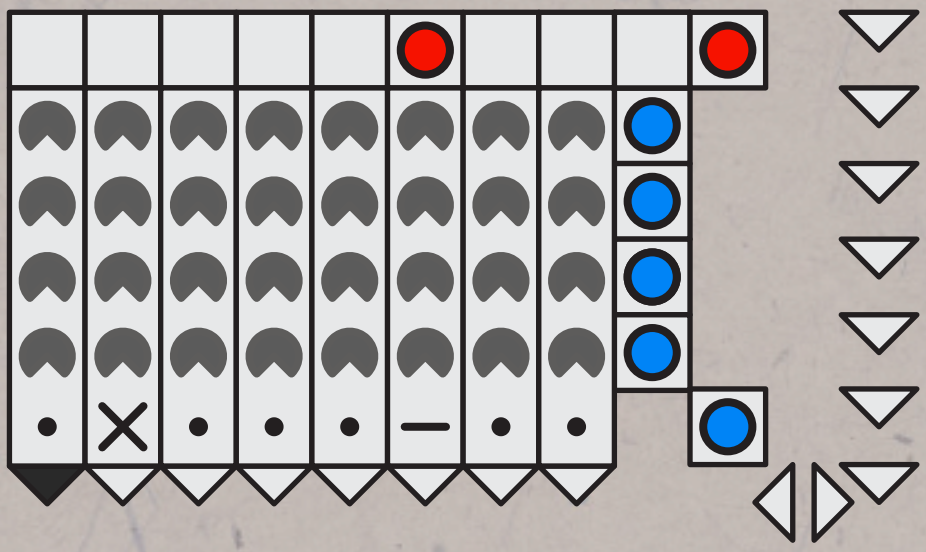
washi

v0.1 beta - manual



Introduction

Washi is a sequencer script heavily influenced by the logic modules of Serge synthesizers.

It does not aim at being an exact replica of each module, but should hopefully give a close enough approximation for anyone willing to play w/ their concepts.

It was developed & released in honor to the 50th anniversary of Serge synthesizers.

It is inspired by the cumulative work of:

- Serge Tcherepnin
- Rex Probe
- Ken Stone
- Dakota Melín (@hale)

The software is in beta right now, and so is this documentation. It's in a usable state but expect bugs and breaking changes in future releases.

Likewise, lots of advanced features are not (yet) documented.

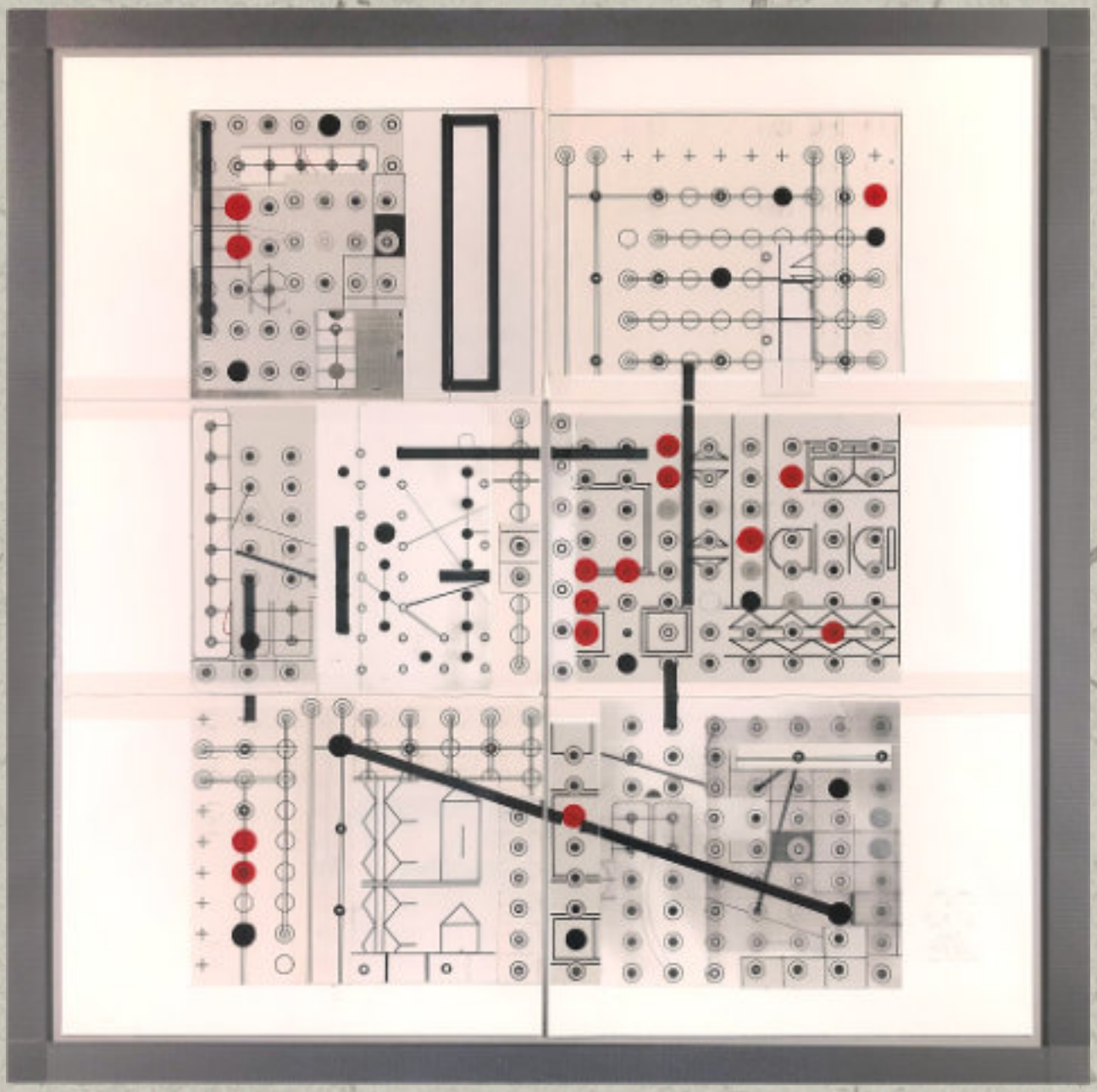
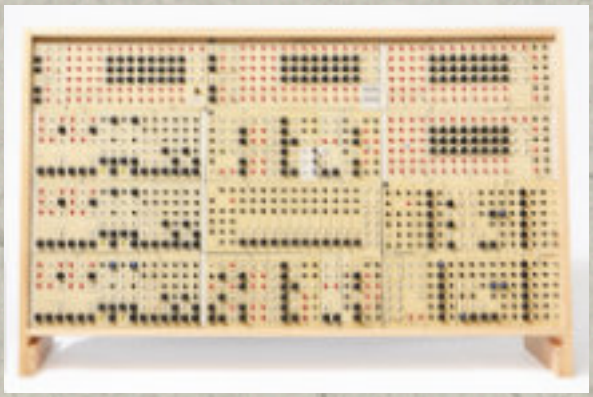


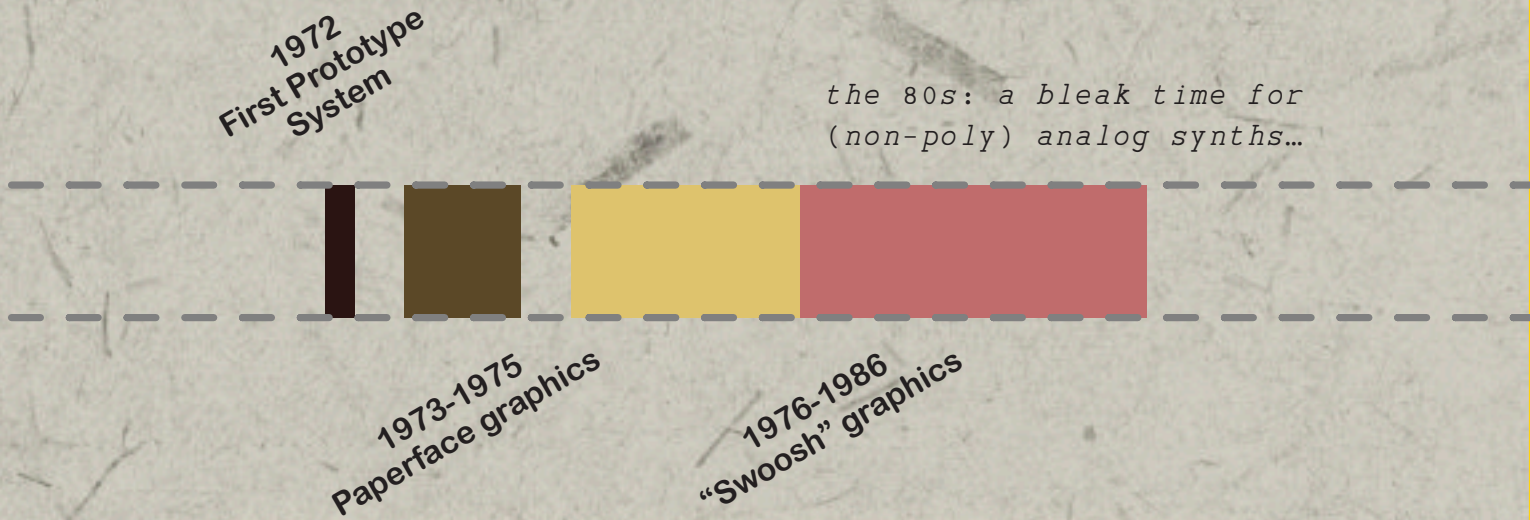
Illustration by Jan Dybala

A brief timeline



The MESS' Serge

SMMS "Series 79" standard config

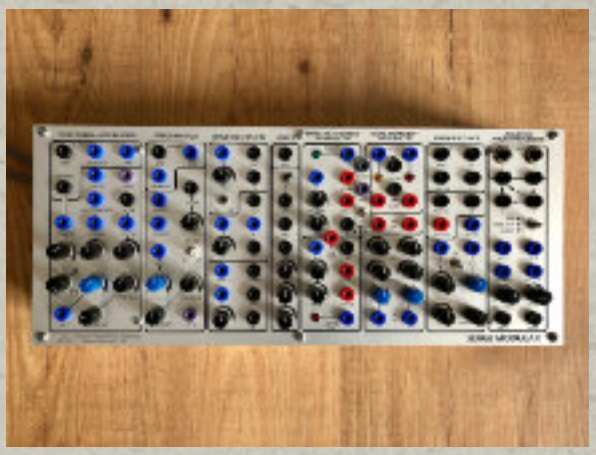


By the end of 1972, the Serge Synthesizer gets created by CalArts professor Serge Tcherepnin, alongside Rich Gold & Randy Cohen.

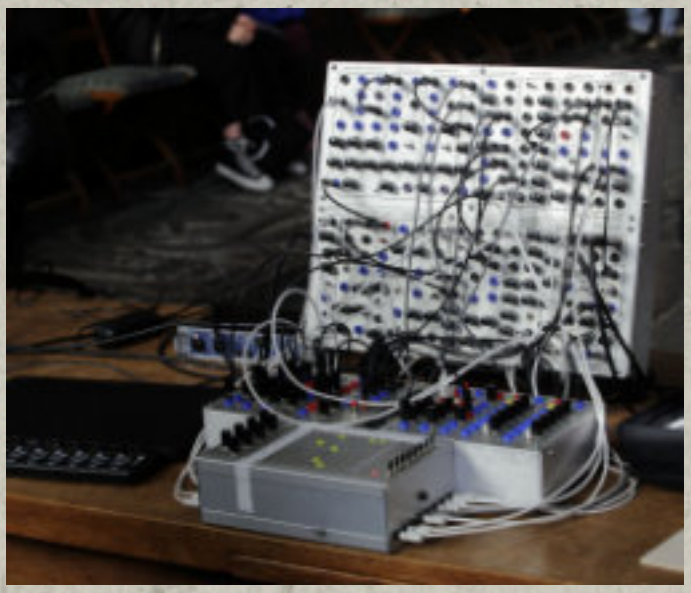
In 1973, the first proper systems get built notably the first 20 by Serge himself in his home.

In 1974, the activity professionalizes. Serge, Rich & Andy found SMMS (Serge Modular Music System), selling both DIY kits & assembled systems.

Alongside this commercial side, schematics of the modules get published in the popular Synapse magazine.



STS Animoo



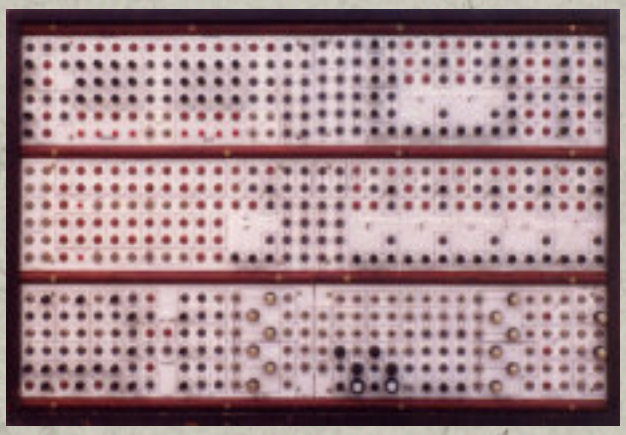
Thomas Ankersmit's
STS system

1990s
STS era

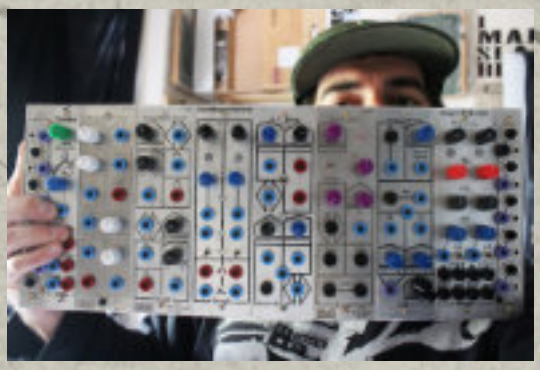
Early 90s: production rights gets sold from SMMS to STS (Sound Transform System), in Hartland, Wisconsin.

Its owner, Rex Probe, continues to develop new modules and improve existing ones.

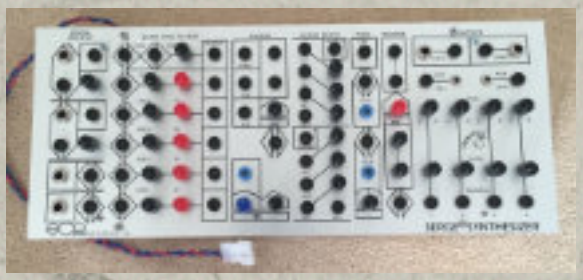
He still continues to produce highly-revered panels to this day.



Ken's restored 73 Serge



A pot-pourri of COA & R*S panels for CGS kits



A COA panel

2000s
CGS

Late 90s - early 2000s: Ken Stone, a proficient DIY synth enthusiast, designs his own synth modules & sells PCBs from them under the moniker CGS (Cat Girl Synth).

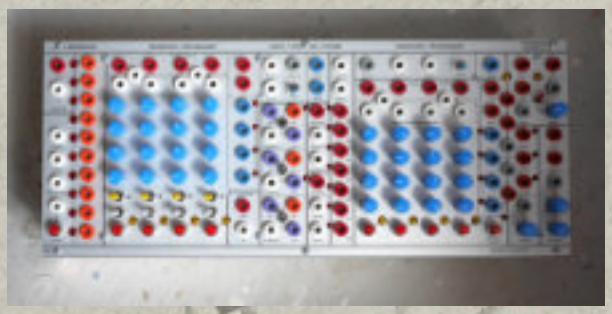
He gets his hand on an early (1973) Serge system is a sorry state and restores it.

As he goes, he starts tracing the circuit and publishing them on his website, reintroducing the DIY aspect to a wider audience.

He realizes how complementary his designs are to Serge's and gets in contact w/ Serge himself. CGS PCBs of Serge circuits gets produced.

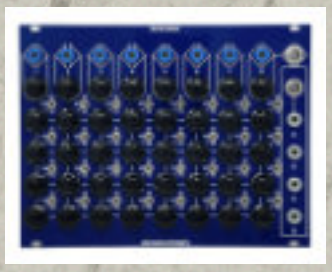
Between 2009-2013, various small scale projects start proposing panels & kits to those CGS boards: COA, THC, R*S...

R*S Crocodile



Custom LW build

73-75 Homebuilt



Low-Gain
Matrix Mixer

Current era

Ken Stone transfers the production of CGS PCBs to Elby Designs in Australia, who also sell built panels.

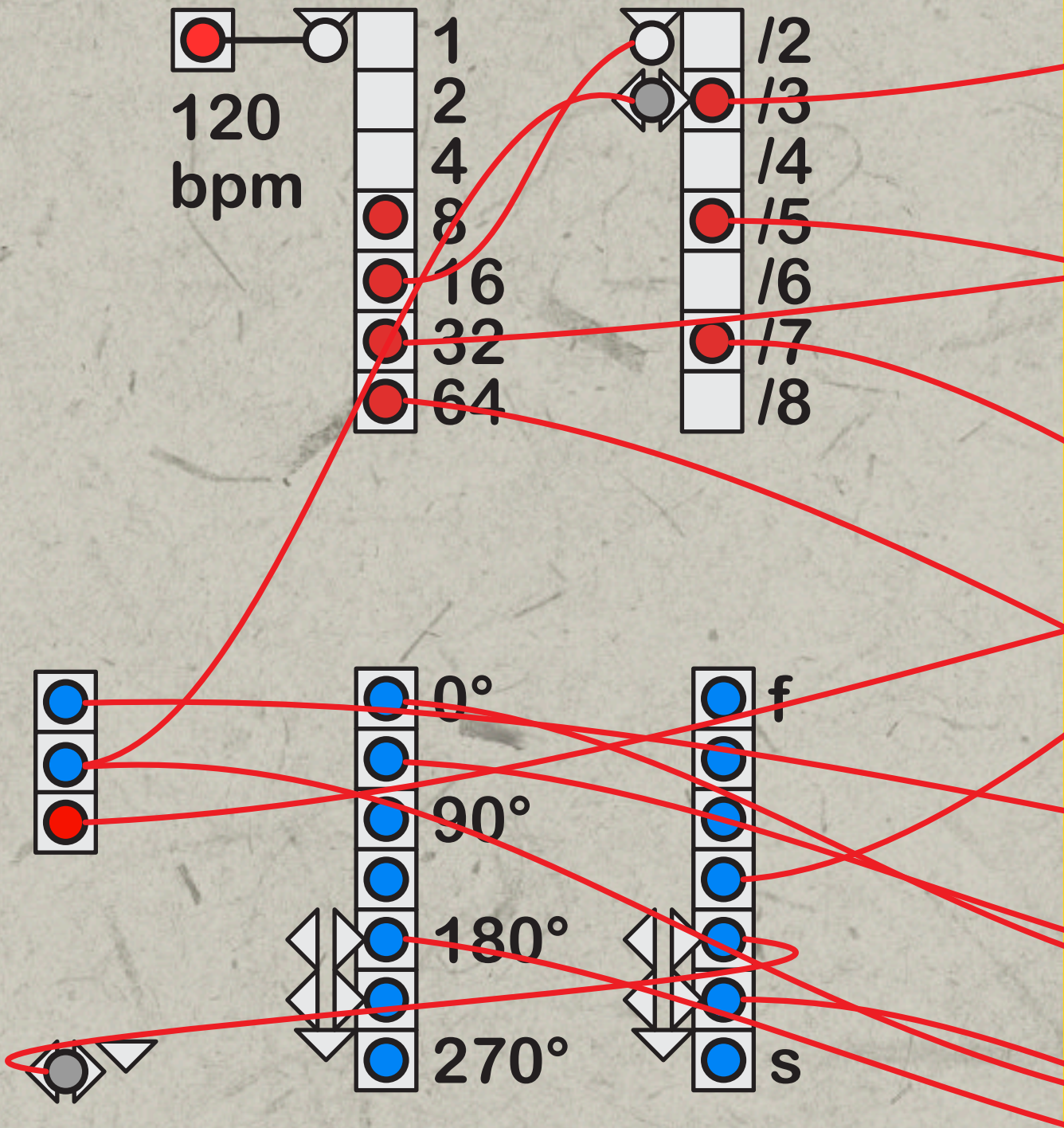
R*S (Random*Source) professionalize, producing original 4U and eurorack format modules and panels. In 2015, they start collaborating w/ Serge on new designs. In 2018, Serge joins R*S as their CTO. He still works on new designs and on improving the old ones.

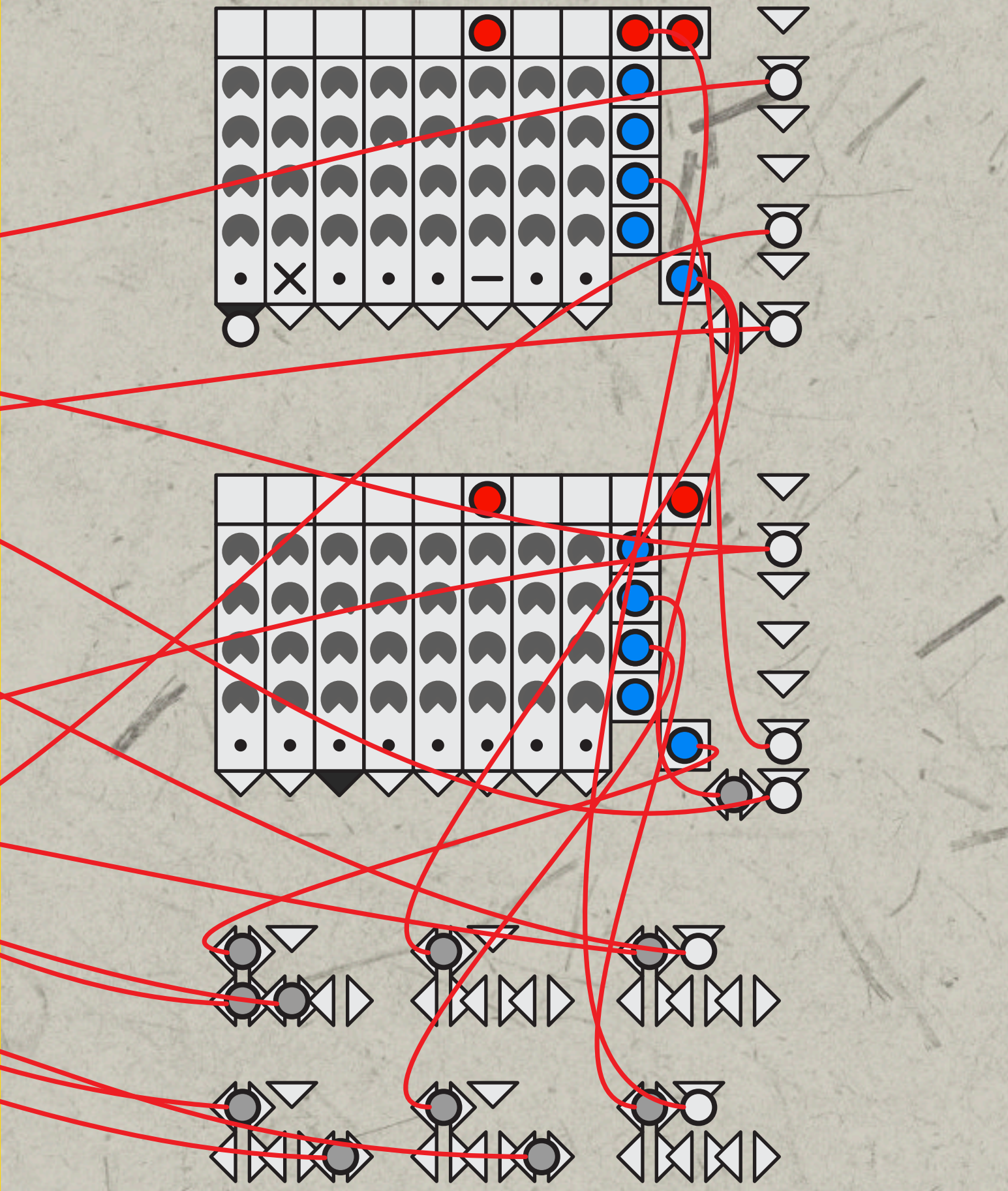
THC launches the 73-75 line, DIY kits based on the early days of Serge synths (paperface era).

In the UK, LW (Loudest Warning) starts producing high quality panels for CGS kits & custom builds.

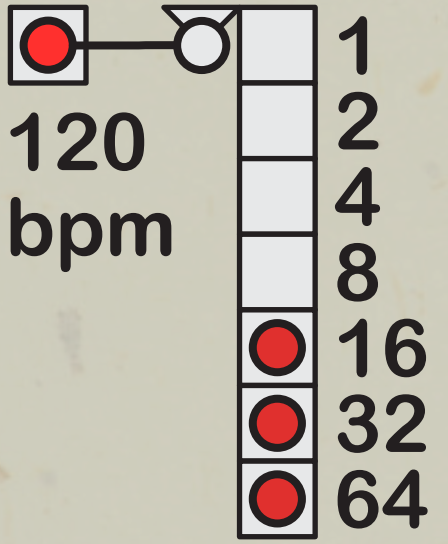
Independent makers start making adapting or making new designs to 4U : Hale, Low-Gain, Slightly Nasty, Setonix…

Modules





	“Quantized clock”



Pulse Outs

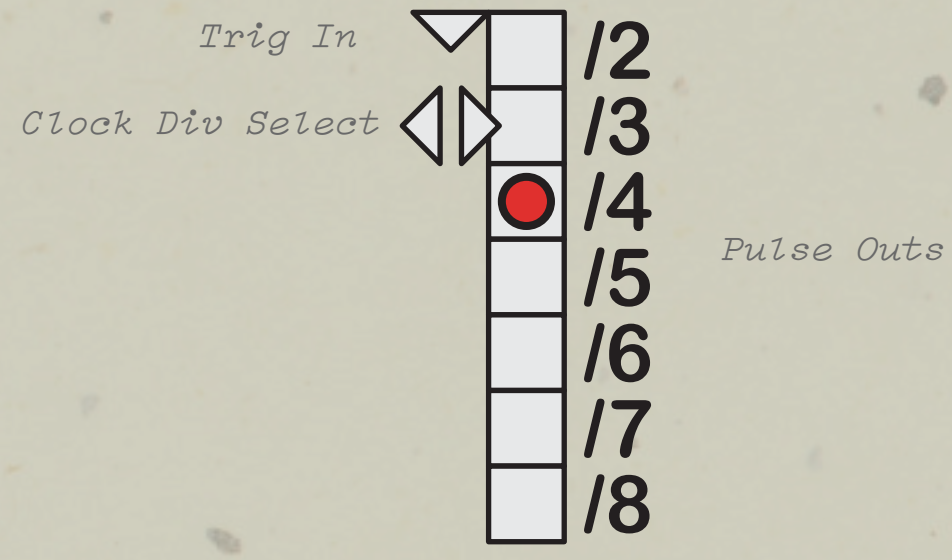
This module is essentially a master clock & pulse multiplier.

It gives access to the global norns clock at different beat divisions.

You can see it as analogous to Pamela’s Workout.

In Serge land, nearly any module fed to a comparator can be used as a clock.

	“Pulse divider”
Serge (STS)	Pulse Divider
CGS	Pulse Divider (CGS36)



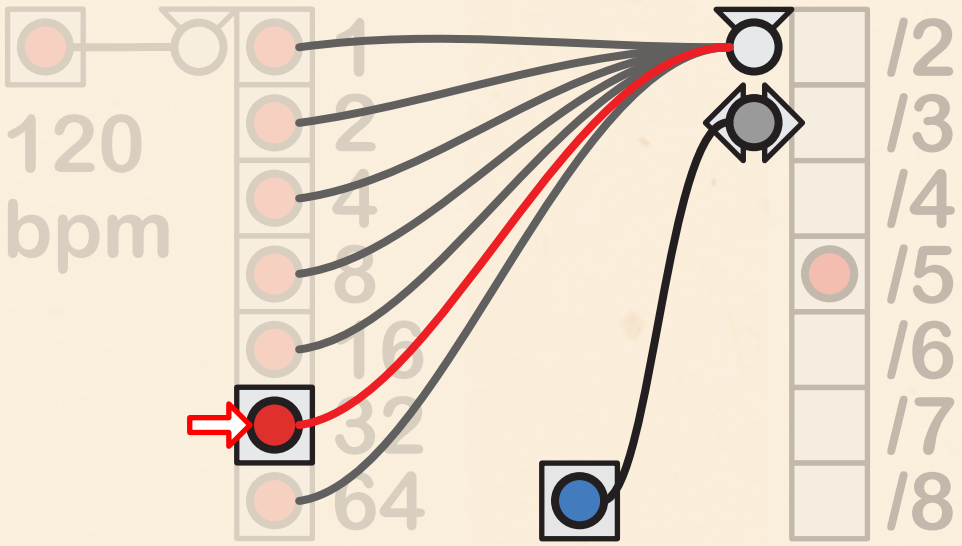
Inspired by the STS & CGS Pulse Divider modules.

Source Clock Div VC

The CV input on that version of the module is a bit special.

It allows dynamically making connections between the quantized clock outs & its trigger input.

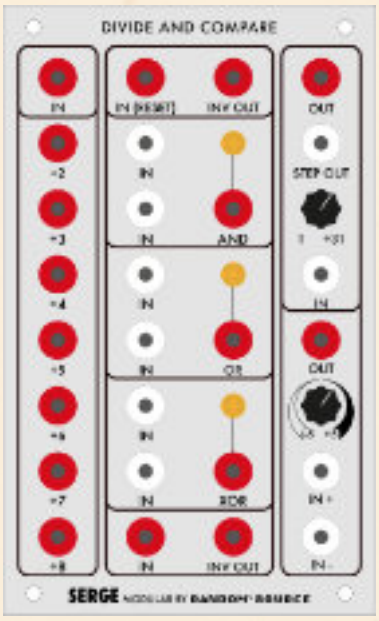
It’s as if the trigger input was hard-wired to all of the quantized clock’s outputs all at once, but no more than one “link” at a time was active.



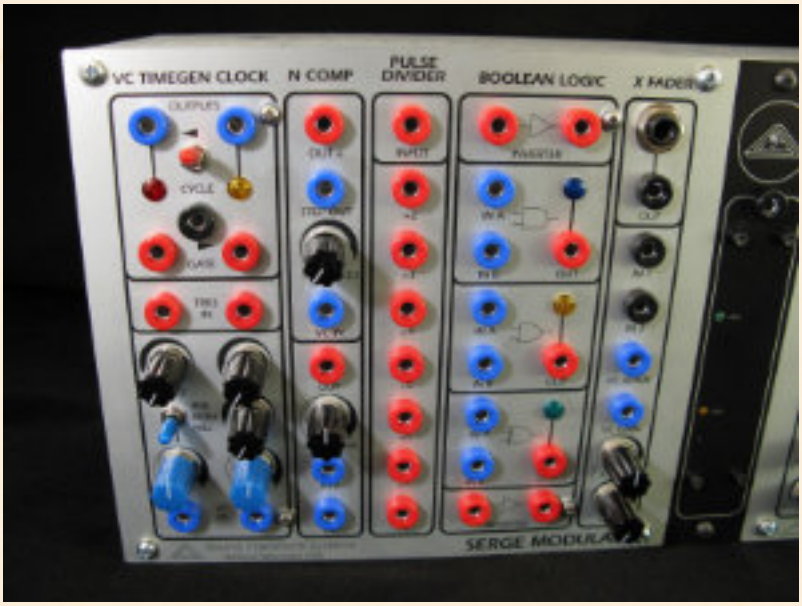
In the real world, one could make such a patch w/ a VC switch (typically Bi-Di Routers in Serge land).

Also, please note that this does not prevent from having the output of other modules plugged into the trigger input at the same time.

LW panel for the CGS PCB

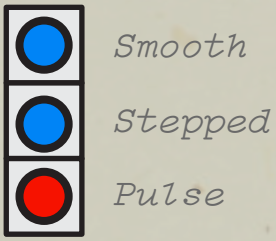


*R*S recently introduced this panel made of Ken Stone designs*



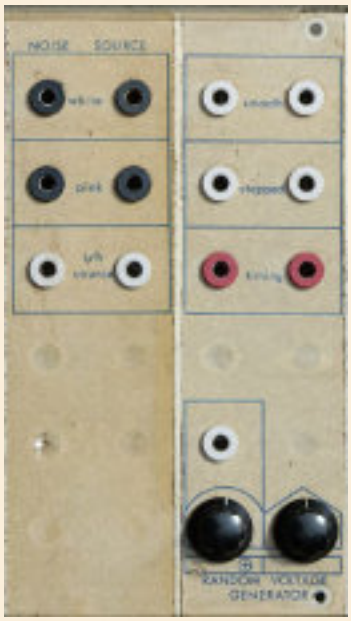
STS also produces a similar module, although unclear if it's based on Ken Stone's or vice versa…

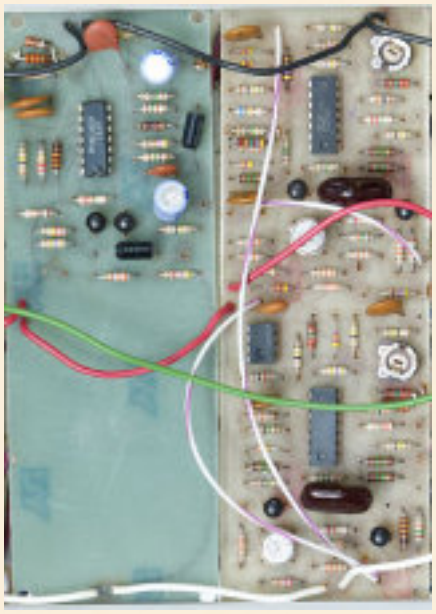
	“RVG”
Serge	*RVG*



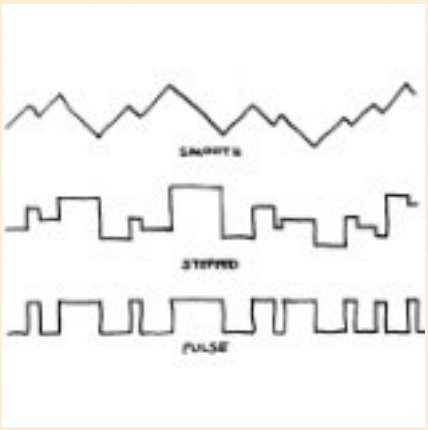
The classic Serge Random Voltage Generator is basically a stripped down version of an SSG, hardwired to a Noise Source as its input.

In more layman terms, it’s a sample & hold.

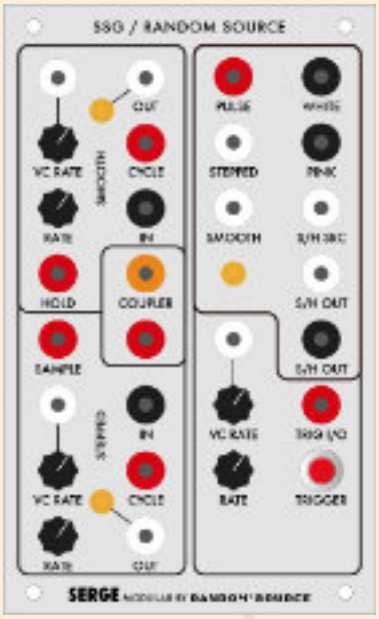




Early paperface Noise Source & RVG combo



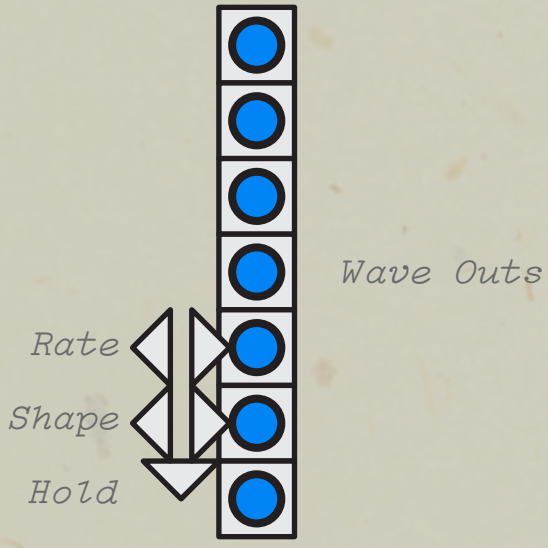
The 3 different output signals



*The Noise Source + RVG combo later got labeled the "Random Source", hence R*S' name*

The Slightly Nasty RVS is a different take on the same idea (different pseudo-random circuit, tweakable slew rate…)

	“LFO Bank”
Serge (STS)	*QUO*
CGS	*Utility LFO (CGS58)* *Master Divider (CGS22)*

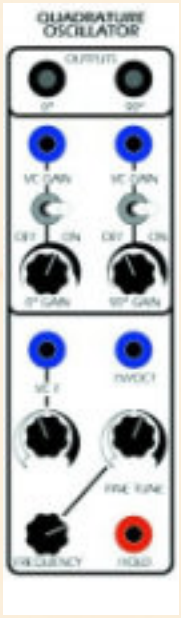


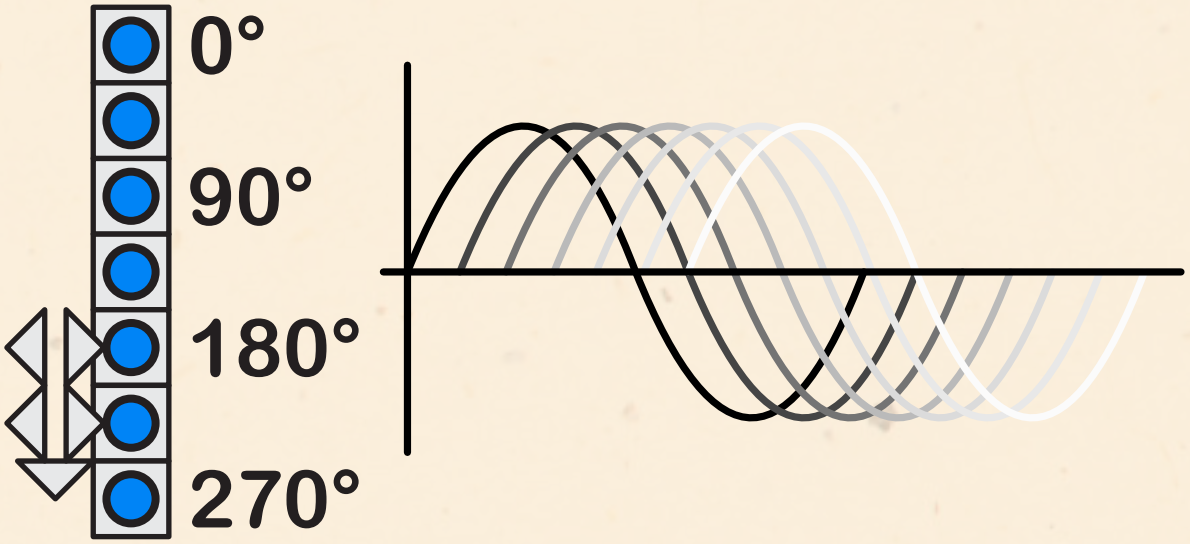
This module is a bank of LFOs synced to a master internal clock.

Like CGS’ Utility LFO module, the wave shape can smoothly transition between different standard shaped. But this implementation allows more More wave shapes and intermediate forms are supported (Sine, Square, Triangle & Saw).

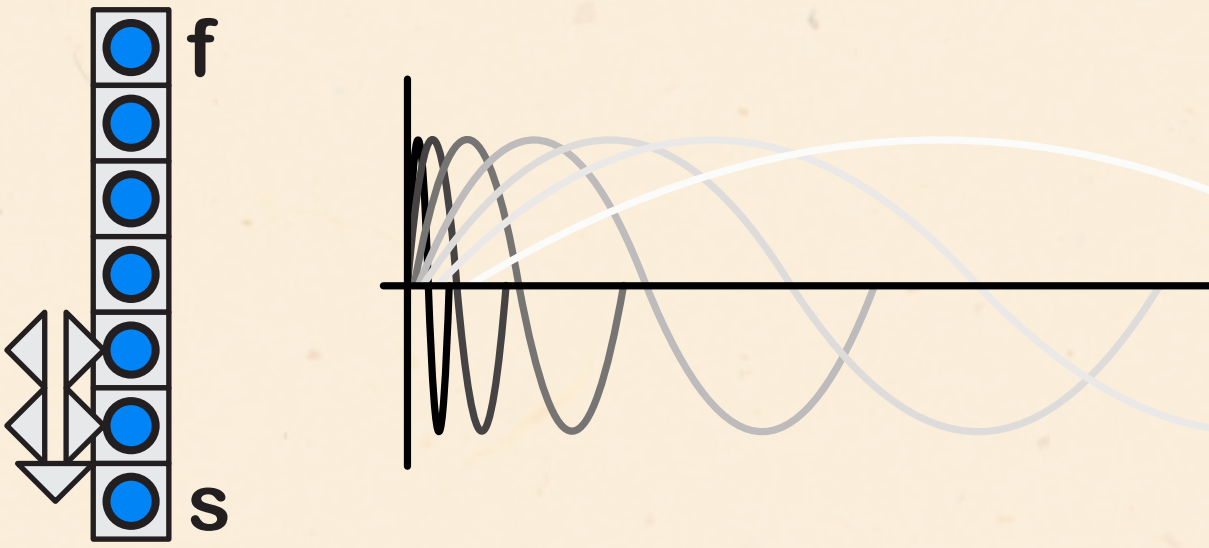
Two instances w/ different tunings are provided.

The first one is inspired by the Serge QUO (Quadrature Oscillator), which provided 2 synced sine waves phase-shifted by 90°. This does the same but with 7 synced variable shape waves shifted by 45° increments.





The second one is modeled around the Instruo øchd, where each LFO goes from super fast to very slow and they are shifted in a way that they appear totally unsynced.



The QUO is an STS-era module, designed by Rex Probe.

One of it’s use as an LFO is for spatial modulation (the 2 opposite sines waves controlling a VC mixer).

It’s a rather uncommon module.

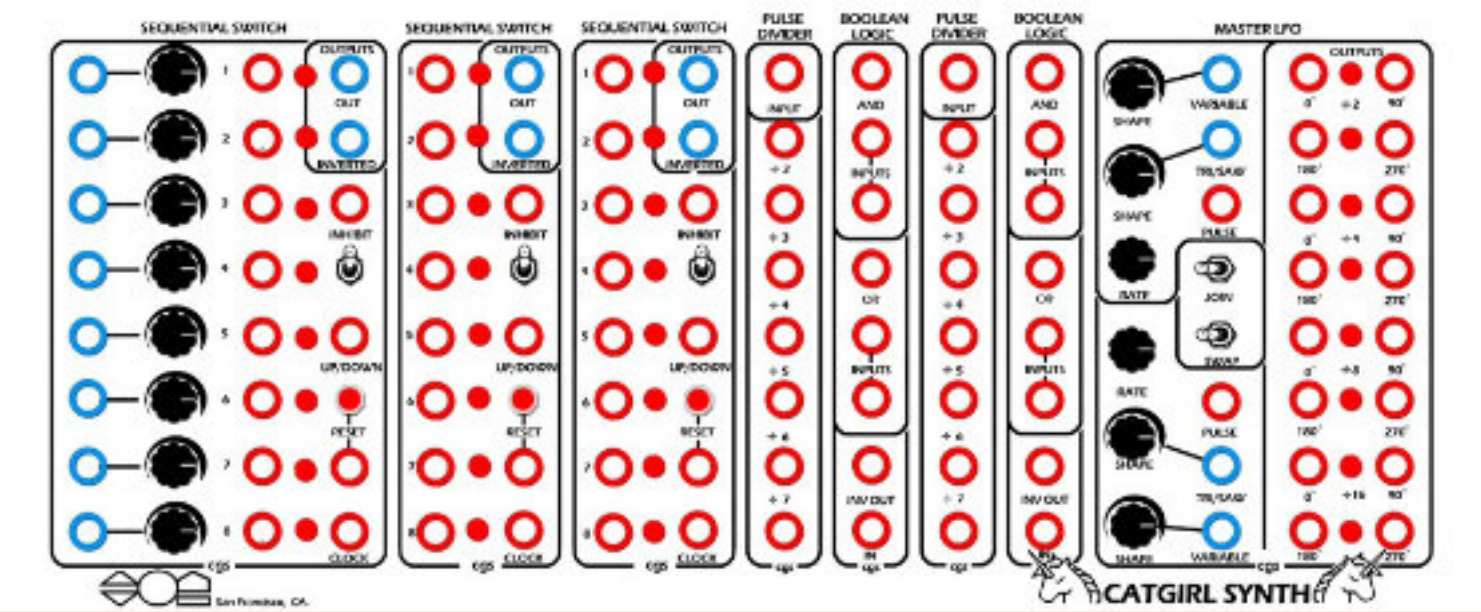
It inspired the Yusynth Quadrature LFO which boasts 4 LFOs (at 0°, 90°, 180° & 270°).

Serge (STS) QUO

Yusynth Quadrature LFO

A similar idea (4 phase-shifted signals) could be found in the CGS “Master Divider” module, except w/ square waves instead of sines.

This module lead to the “Master LFO” module of the COA “Cannon Engine” panel, tying a CGS Utility LFOs & a Master Divider (one clocking the 2nd). This idea is what inspired the variant included in Washi.

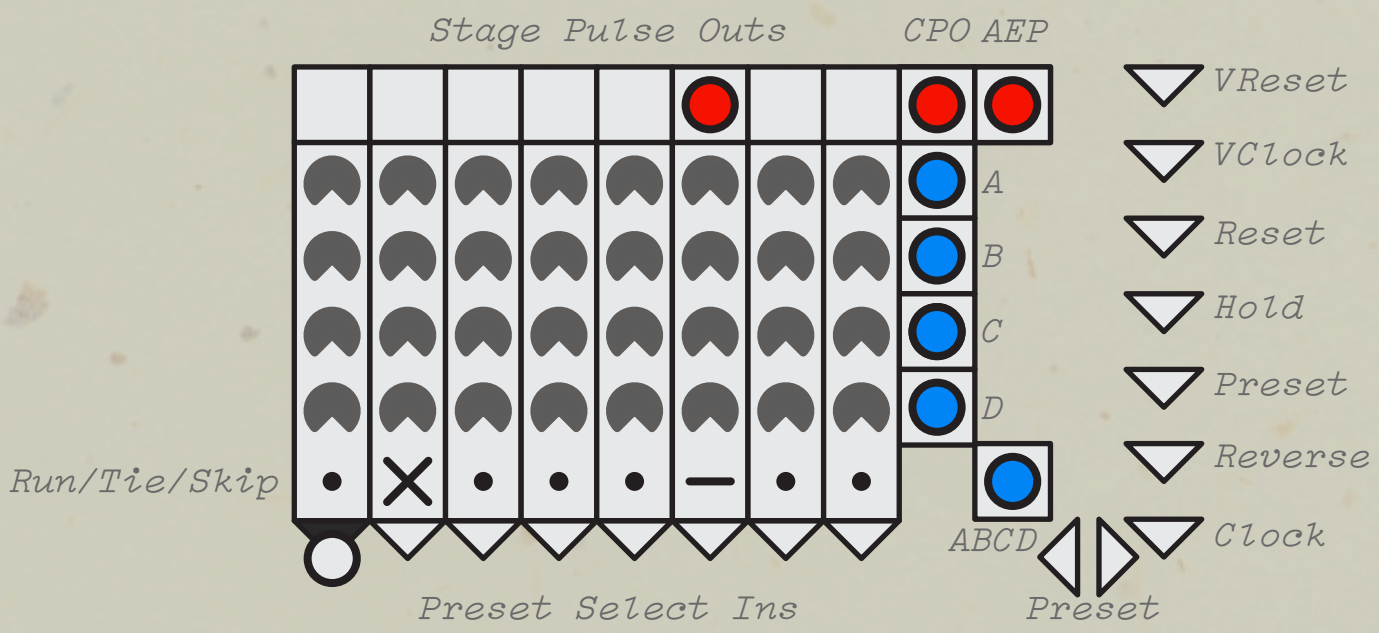


COA Cannon Engine, w/ Master LFO on the far right

CGS Master LFO

Instruo øchd

	“Haleseq”
Serge	*Programmer / Sequencer*
CGS	*Programmer / Sequencer (CGS87)*
hale	*8 Stage Complex Sequencing Programmer*



This module is at the heart of the script.

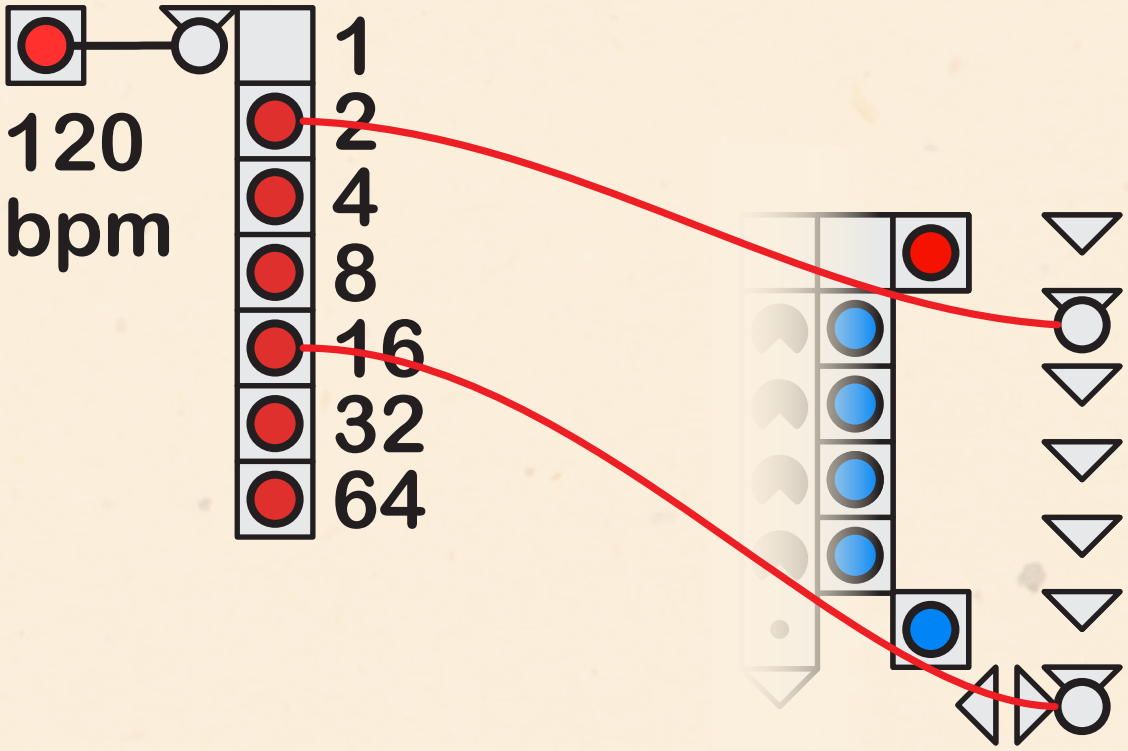
So much so that 2 instances of it are included.

The module is a clone of the “8 Stage Complex Sequencing Programmer” from hale modular, which is a Sequencer/ Programmer w/ all the bells & whistles.

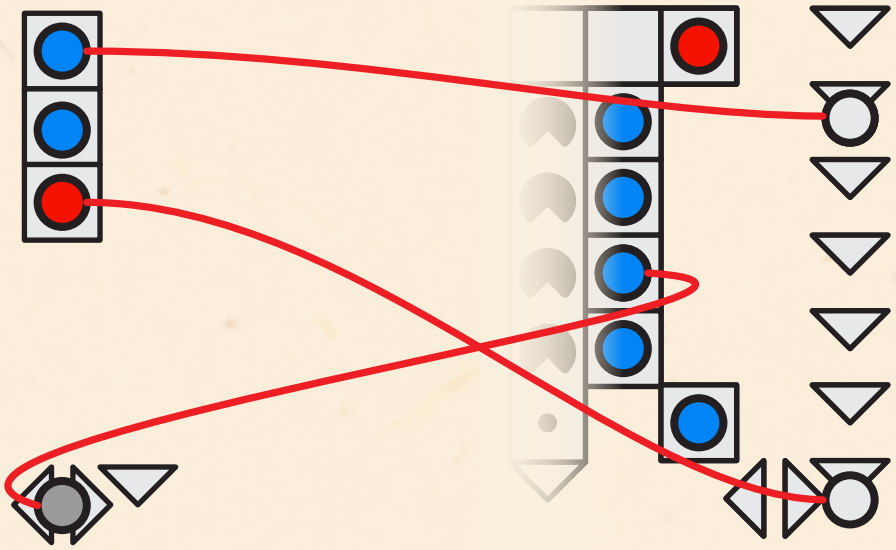
It boasts 8 stages (columns) of 4 rows (CV values). The currently active stage sends its row CV values to the 4 corresponding CV outs (A, B, C & D) as well to a special multiplexed output (ABCD).

Clocking

Using a Clock of 1/16 bar and a VClock of 1/2 allows going through each cell sequentially w/ the ABCD output. This allows using the module as a 32 steps sequencer.



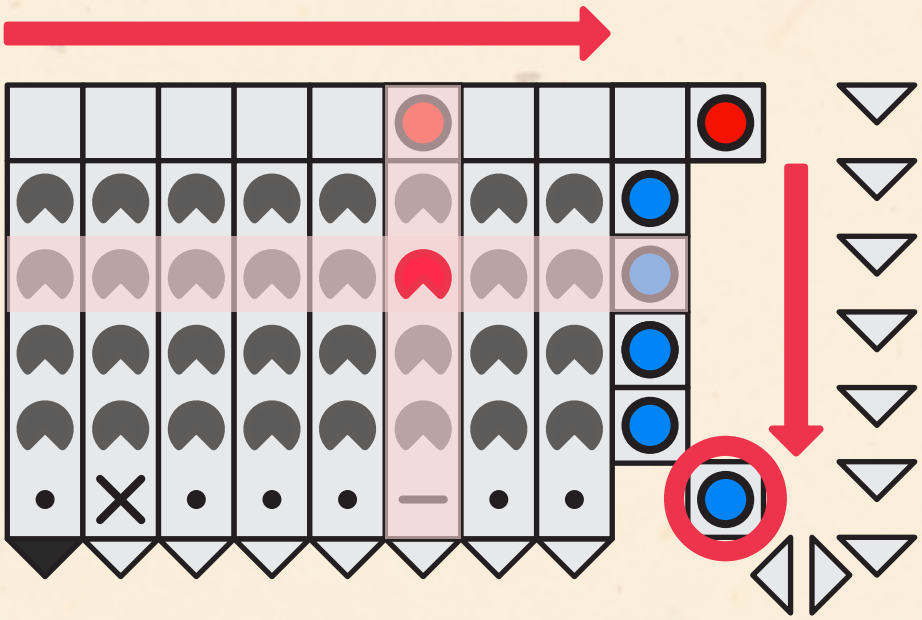
As each trig input has an internal comparator, we're not limited to use pulses but also CV to control clocks!



Mux Output (ABCD)

A multiplexed output ABCD takes the value of the knob at intersection of selected Stage (horizontal) & Row (vertical).

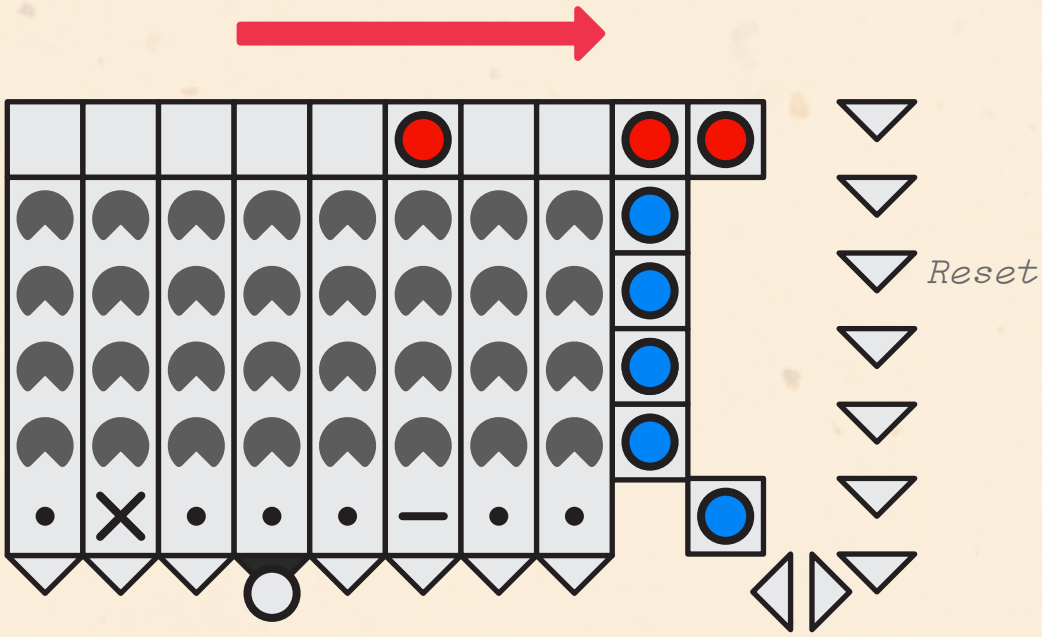
Here, it corresponds to Stage #6 and Row B:



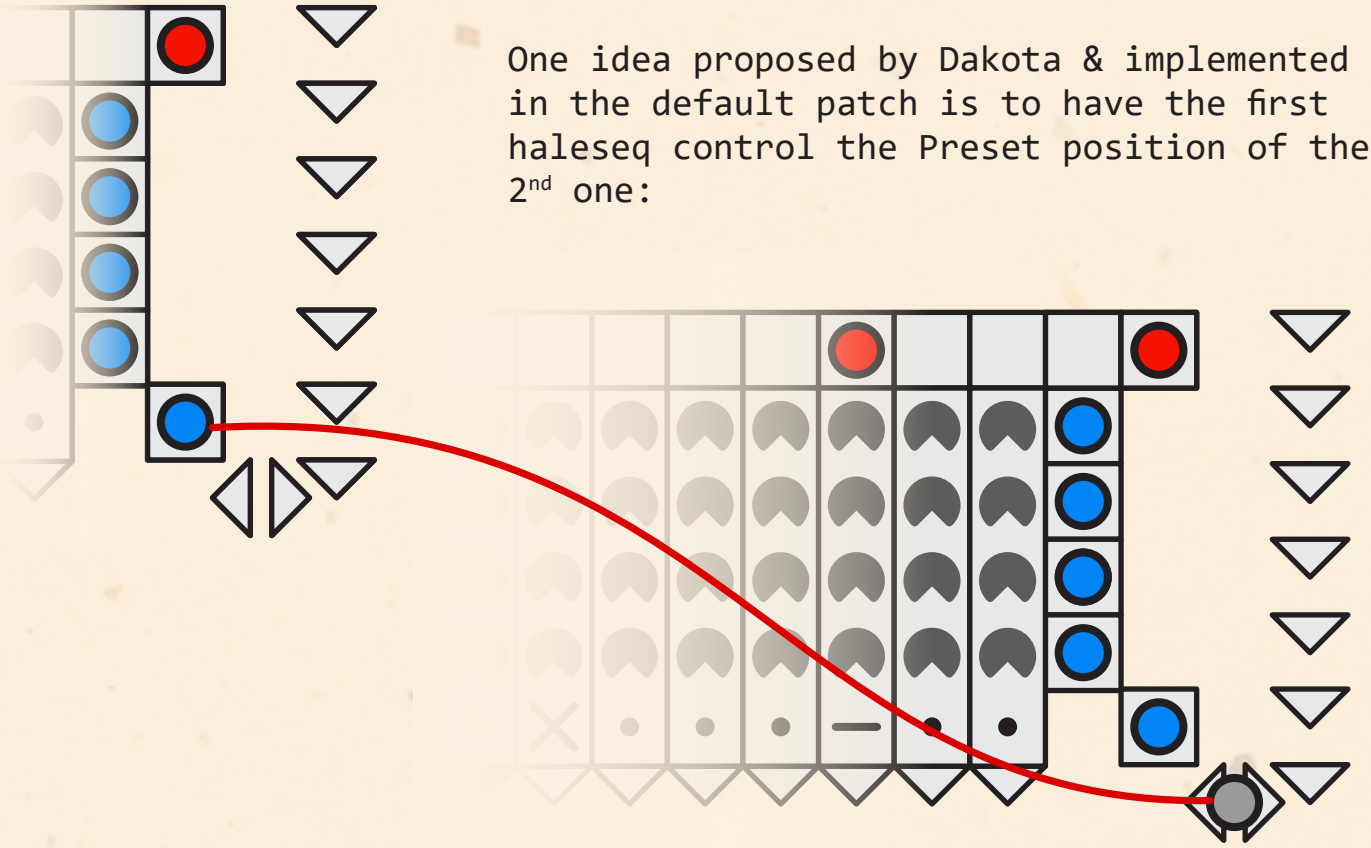
Preset & Reset

Triggering a Stage select in sets the Preset here.

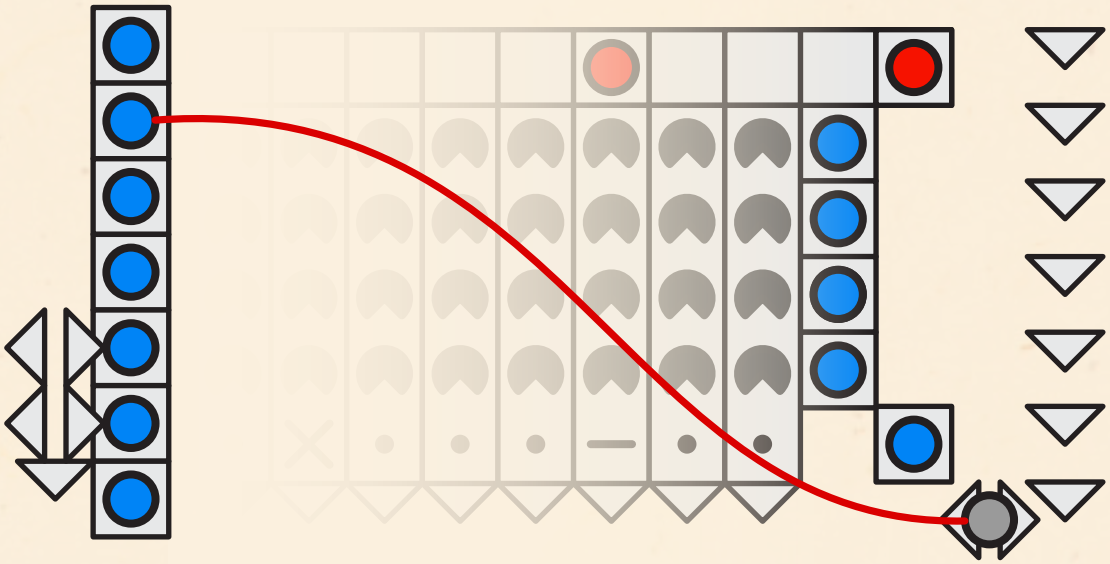
This shortens the sequence length but this can be temporarily bypassed by setting the Reset input high.

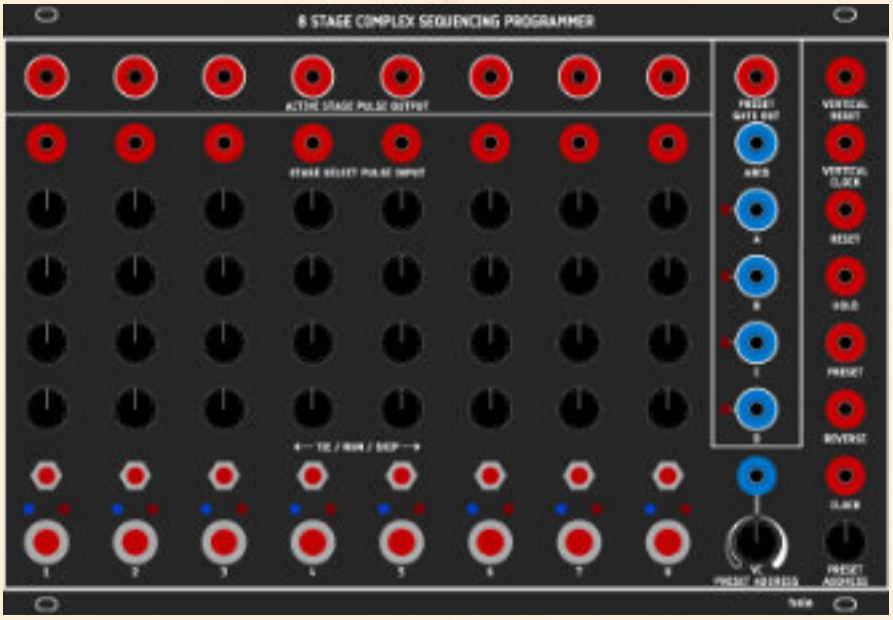


One idea proposed by Dakota & implemented in the default patch is to have the first haleseq control the Preset position of the 2nd one:

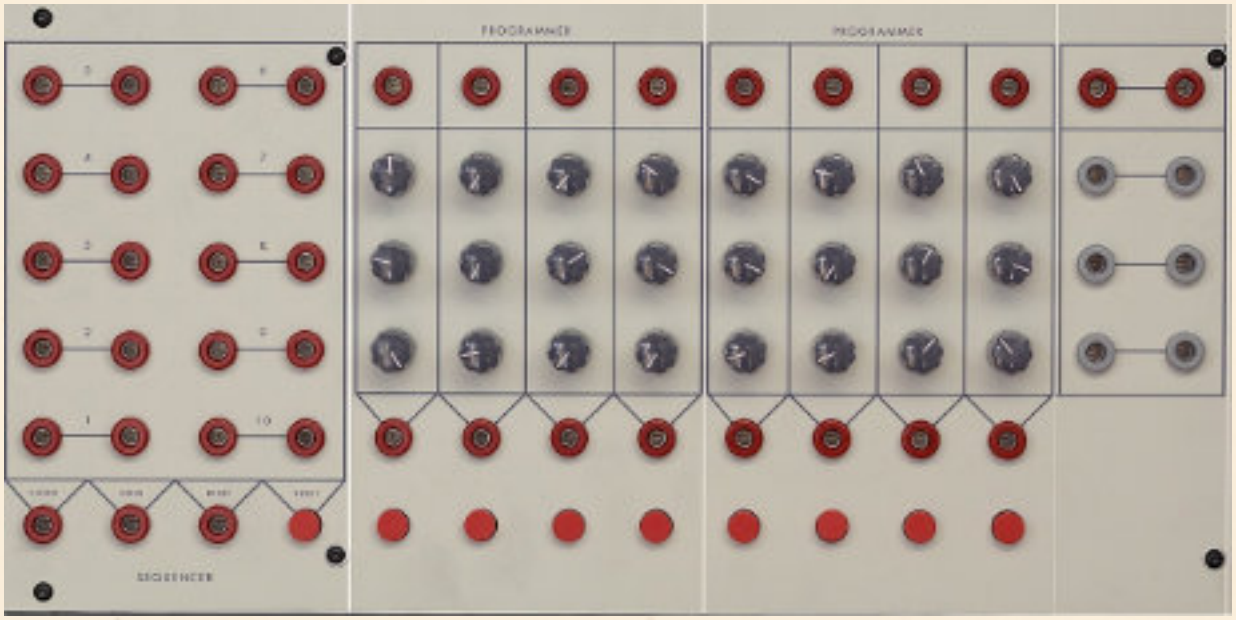


Alternatively, a LFO would allow achieving a similar kind of effect. Try different wave shapes to obtain different sequencing patterns.





Hale 8SCSP, which inspired this module in Washi

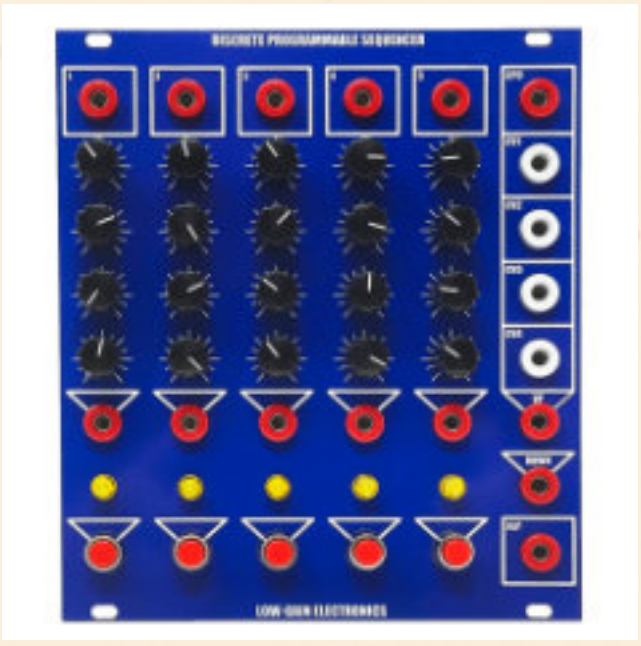


Example of very early "paperface" era Sequencer / Programmer.

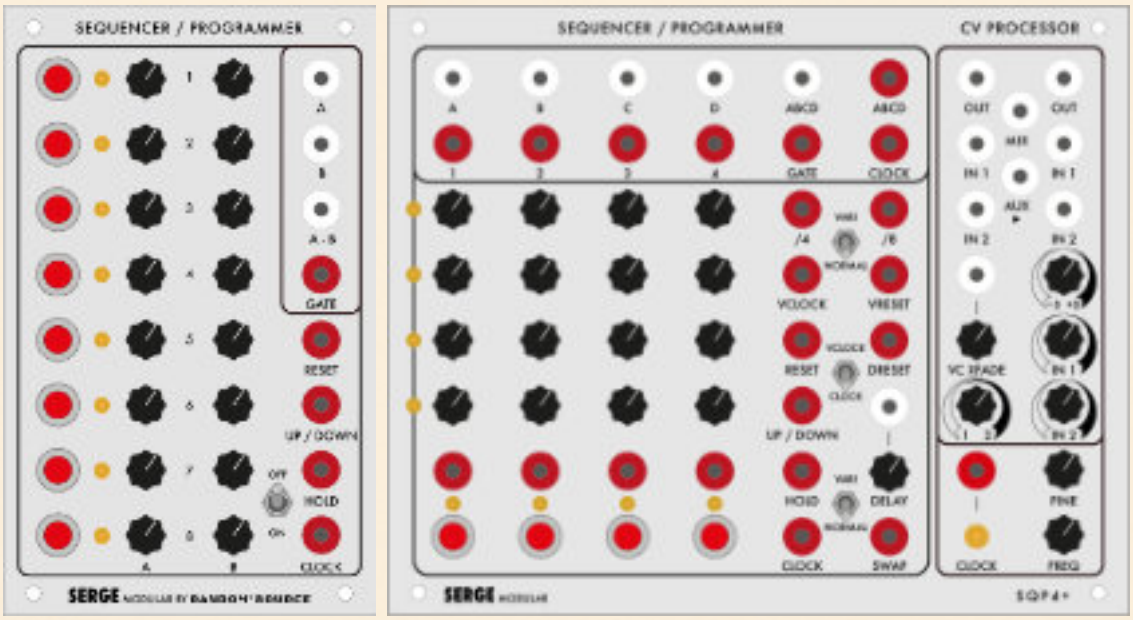
So early that the two function blocks were split in 2 different modules (in true patch programming fashion). One would need a bunch of cable to have the sequencer trigger the change of stages.

This was such a common use-case that builders would typically permanently do this wiring internally.

LW w/ mux mod (CGS)

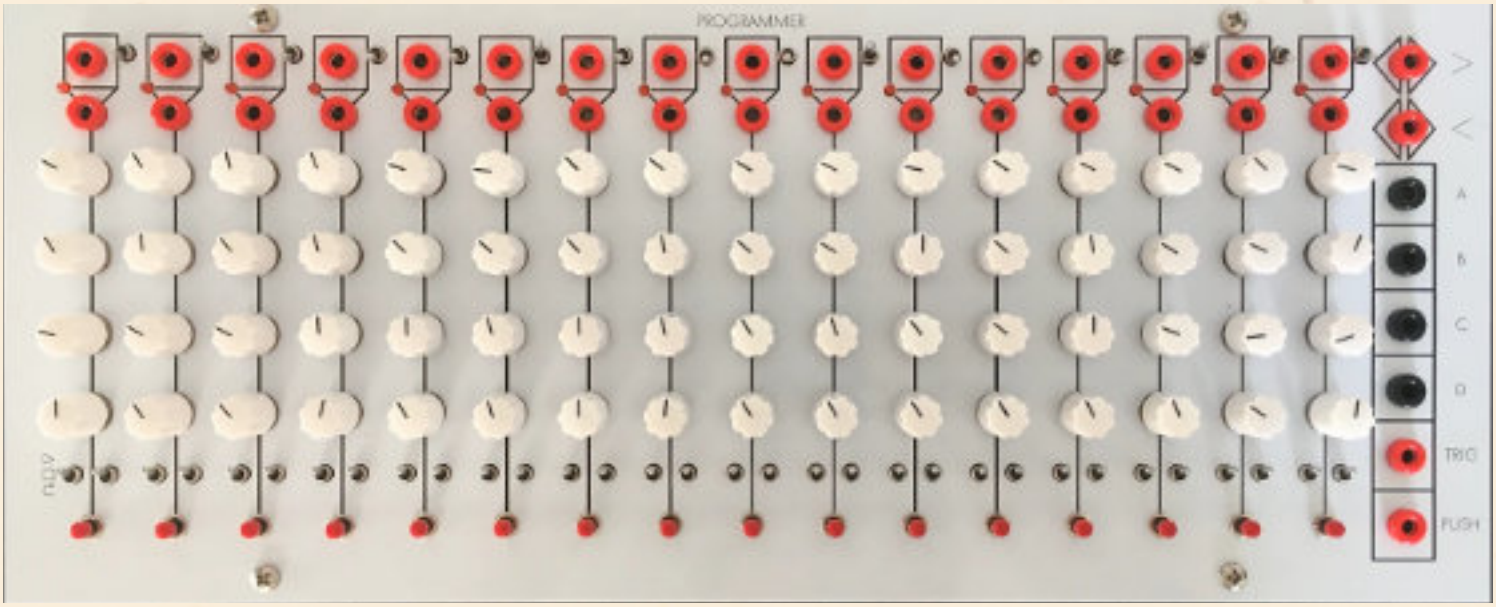


Low-Gain



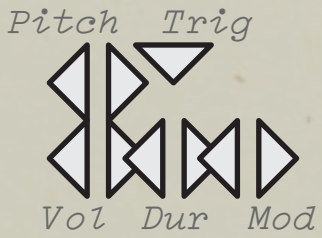
*R*S*

Minimal or feature-packed…



BPoOT (based on CGS)

	“Output”
Serge	Send, Gate



This module is what allows to actually make CV values useful.

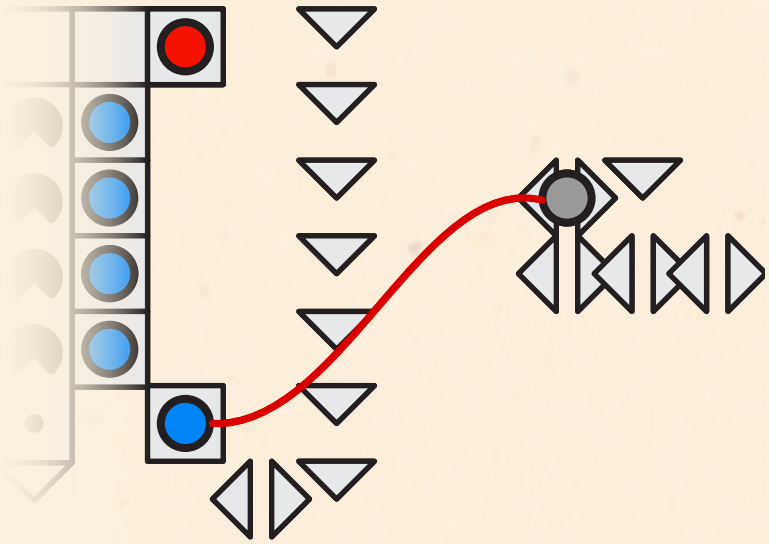
Each output is assigned a nb output, allowing to trigger “nb voices” (sound-producing mods, such as emplaitress) as well as external hw through midi or crow/i2c.

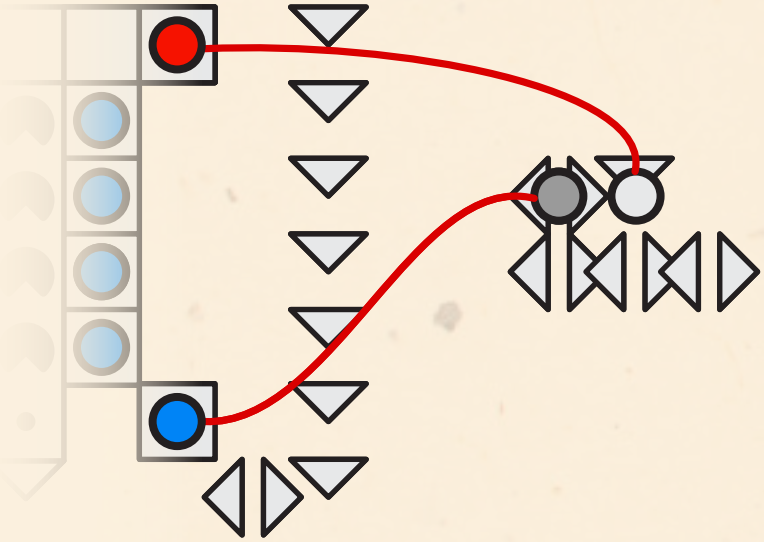
You typically want to connect those to haleseq CV outs, but anything is allowed.

Implicit Trigger

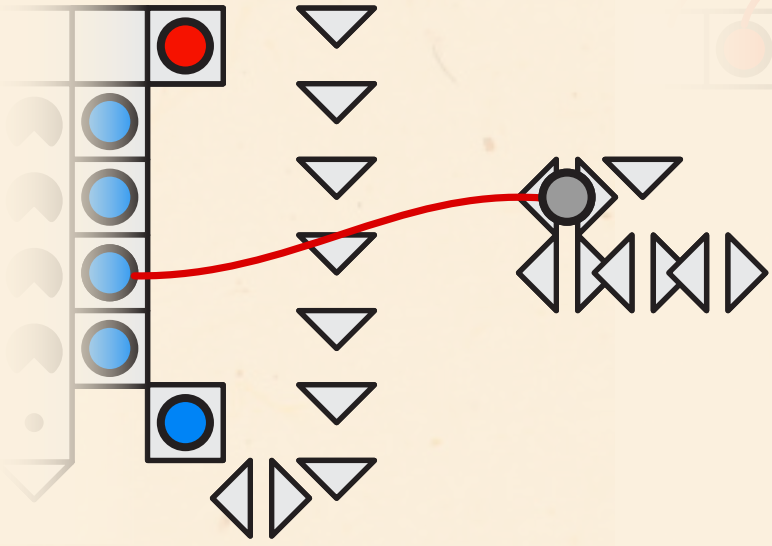
When a haleseq CV out is connected to a pitch CV input, there is no need to connect anything to the trig in.

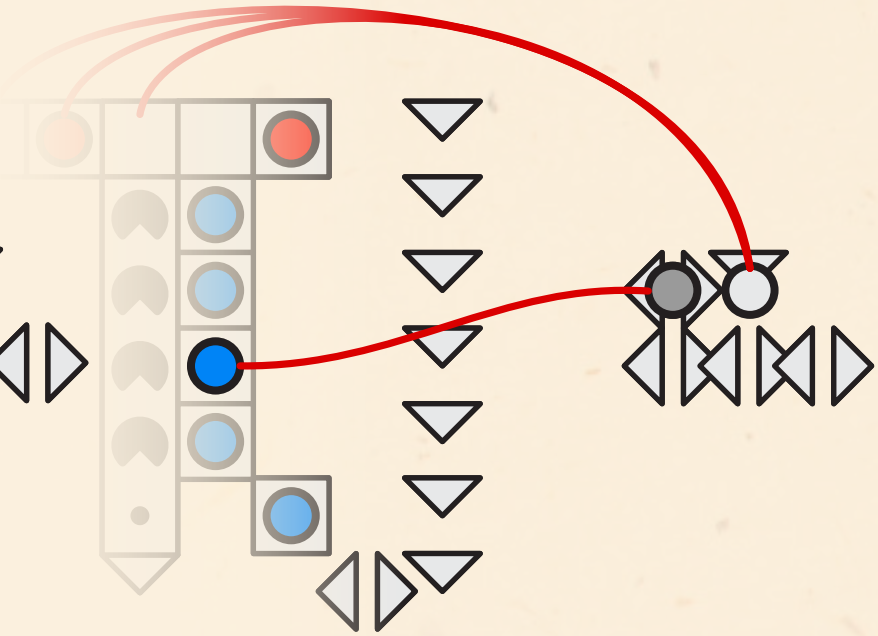
These 2 patches are equivalent:





And so are those:





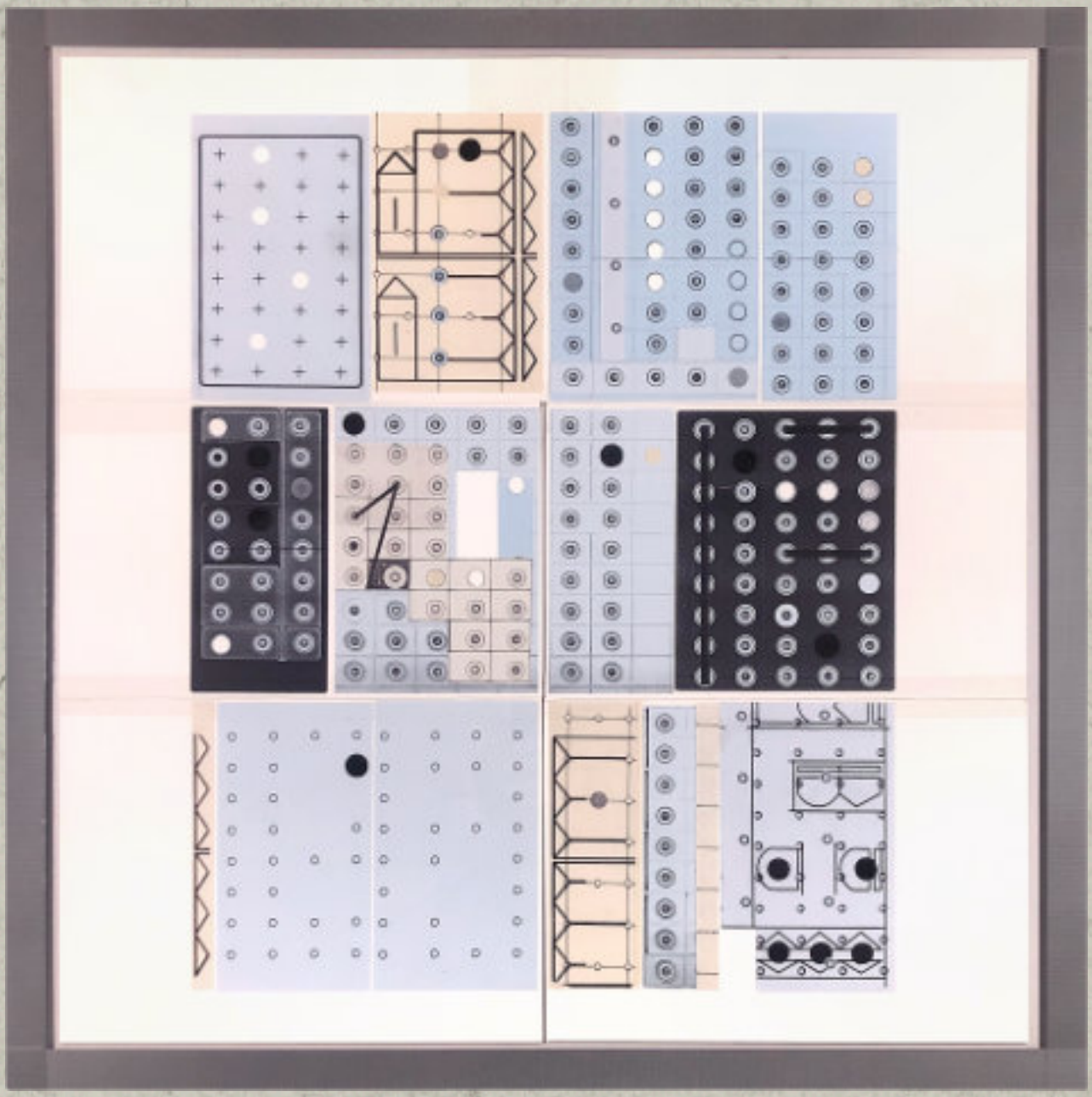


Illustration by Jan Dybala

Background textures are images by user rawpixel.com, hosted on Freepik.

Illustrations found in the endpapers by Jan Dybala.

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