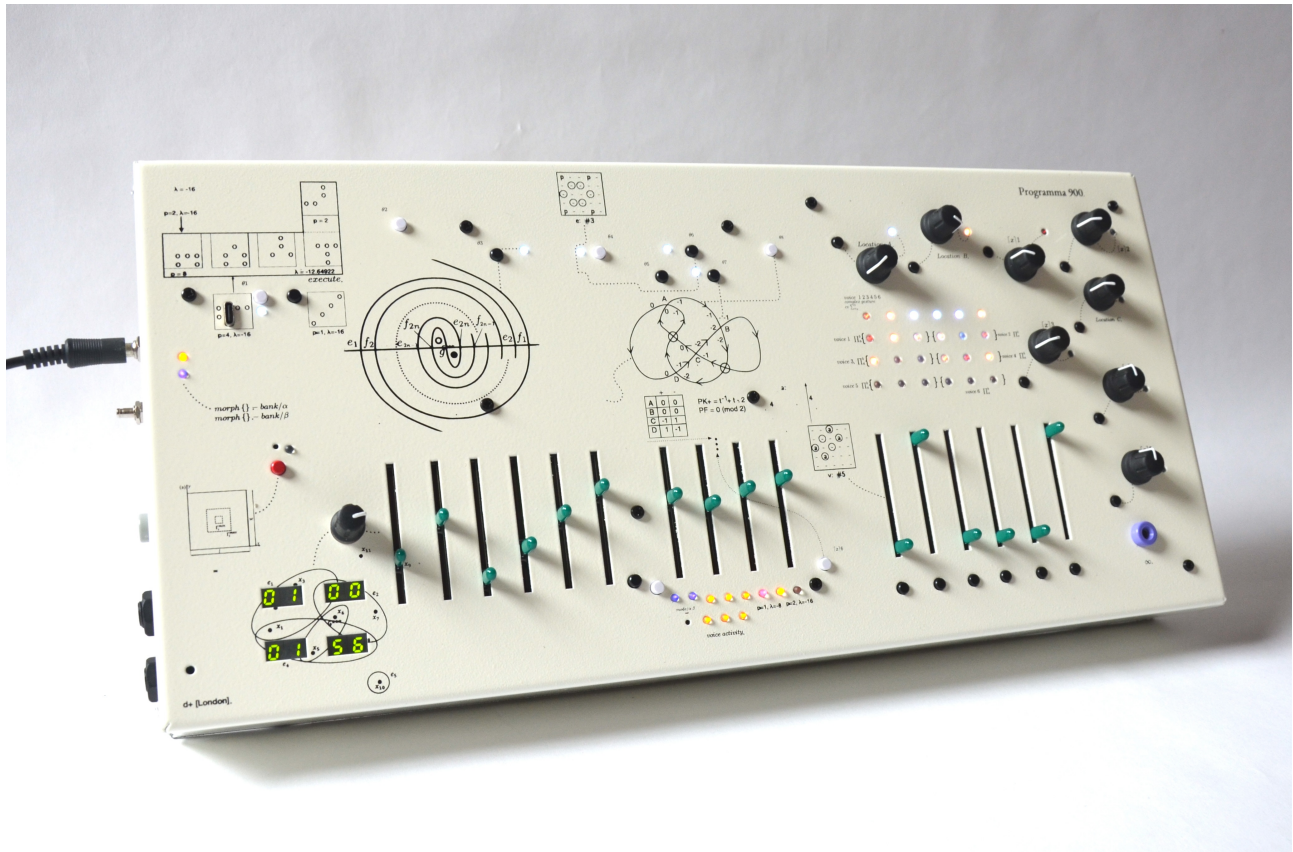


Programma 900.

Quick start
Operational
manual

v.2

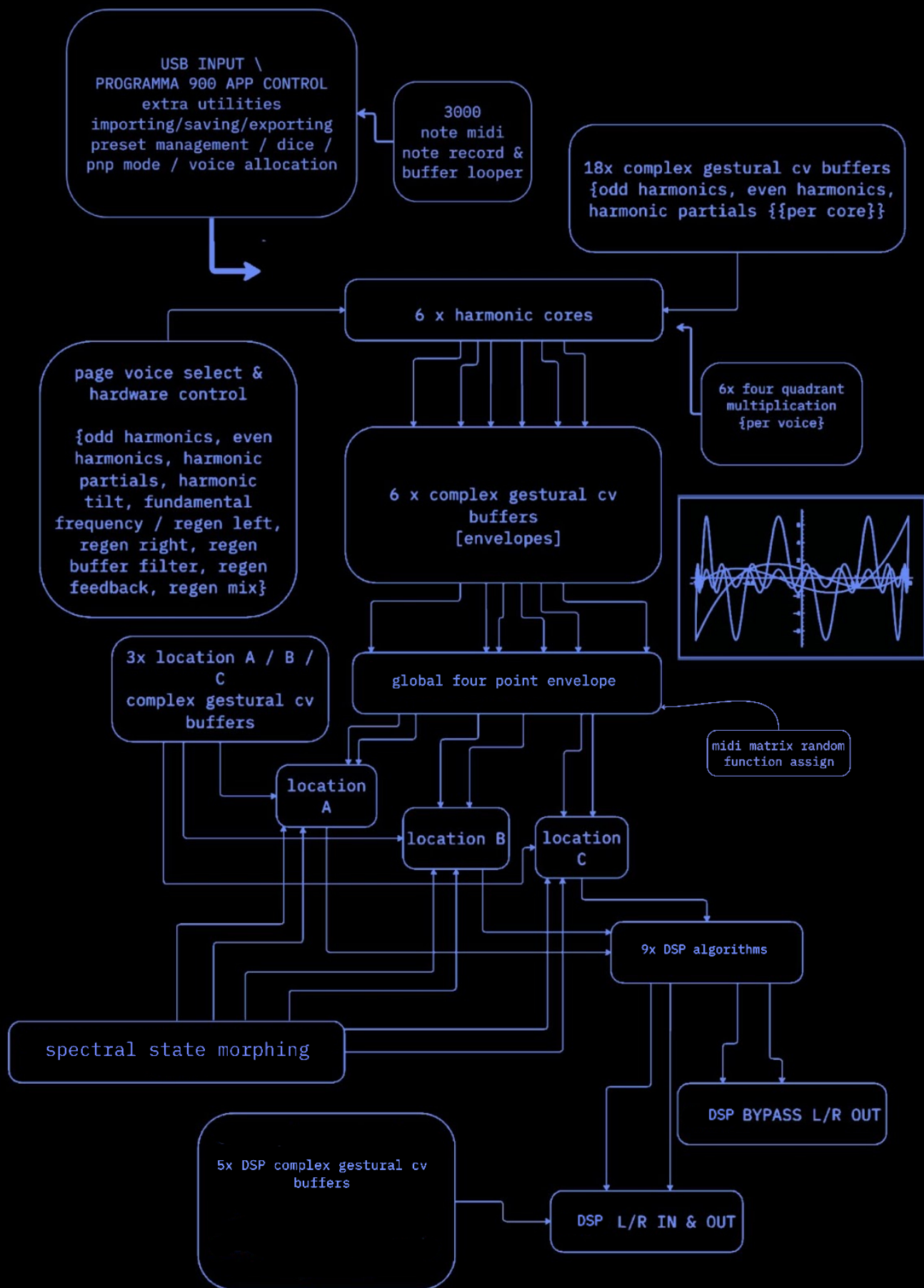


Programma 900 is a harmonic musical computer.

Built on fpga and arm cortex technology.

{Index}:

- Signal diagram
- Encoder pages / preset saving loading system.
- harmonic core parameters
- Voice Envelopes, modes, complex gestural cv buffers, modulation destinations.
- 9 DSP Algorithms
- Midi / daw connectivity
- Midi record and loop buffer
- Spectral state morphing & Harmonic lock
- Midi matrix and per note function assign.
- Dice & Voice assign modes



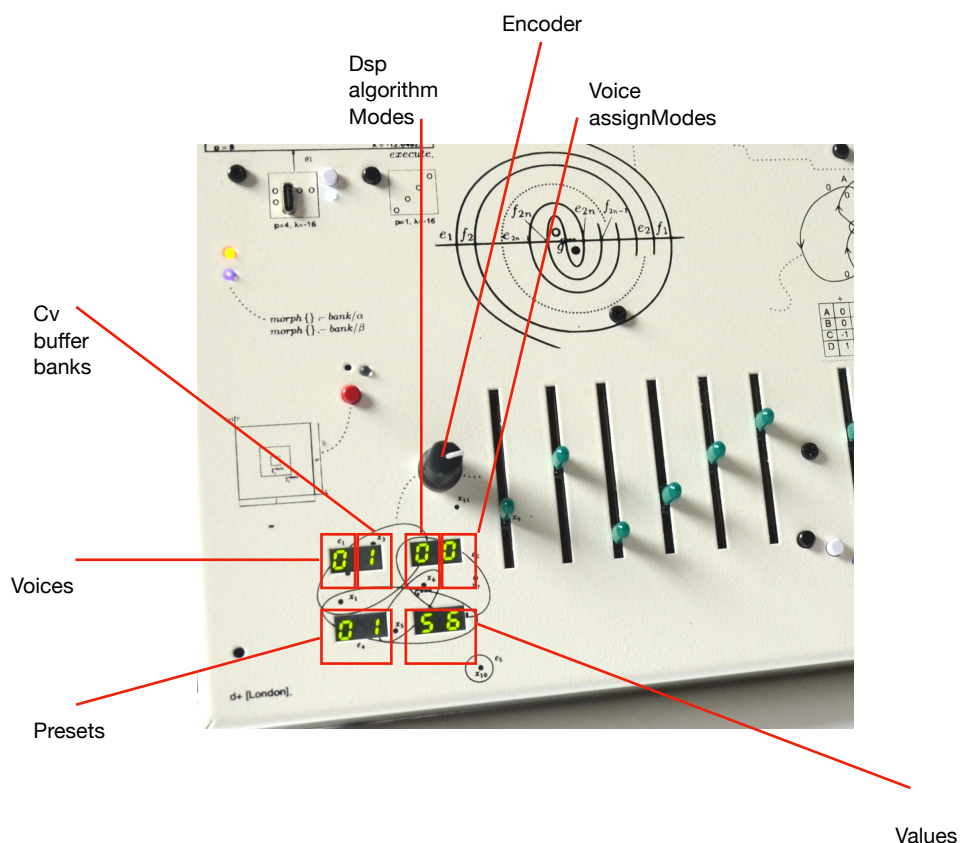
IMPORTANT: Programma 900 is a high performance device with a large amount of processors. As such, heat dissipation and environment must be considered if left running for large amounts time. Temperature can and will effect your instrument.

Encoder pages / preset saving loading system.

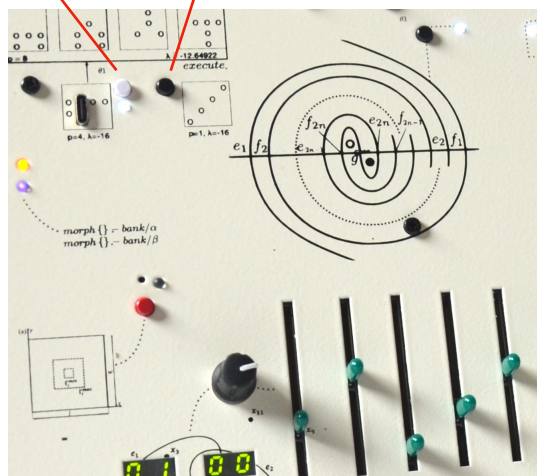
The encoder and pressing its button will scroll through pages and edit the associated values on rotation.

The flow of the pages are as follows :

harmonic voices > cv buffer banks > DSP algorithm modes > Voice Assign modes > Presets



Save Load / execute

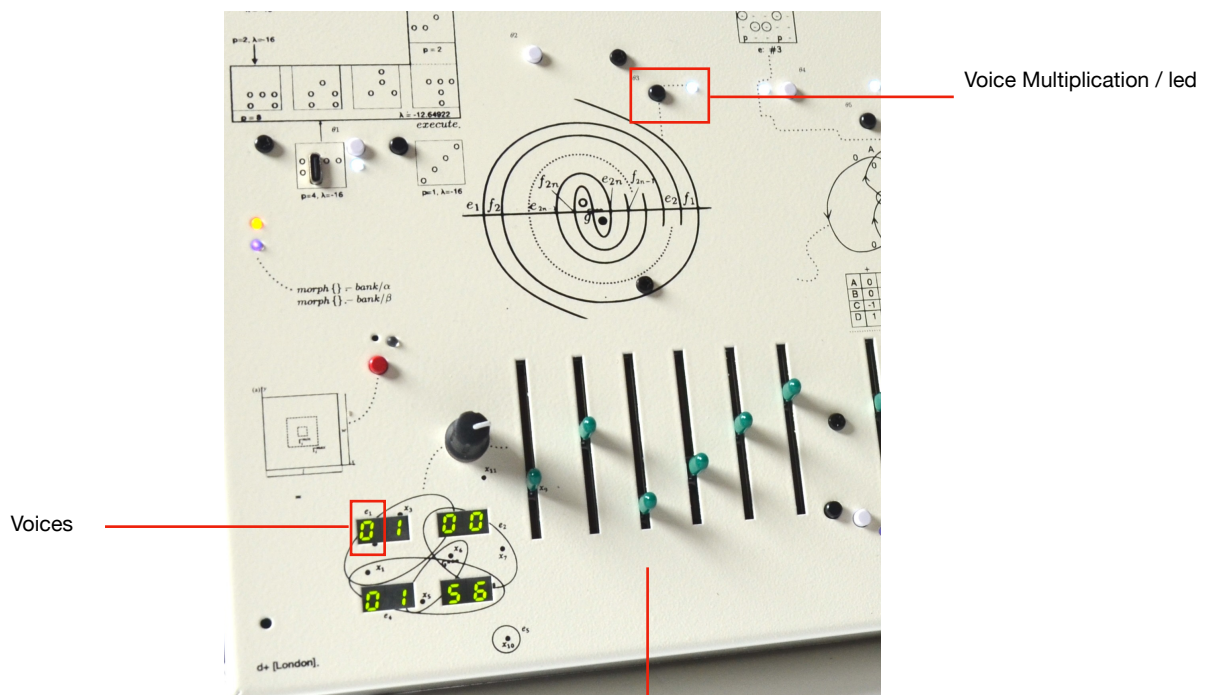


The internal eeprom allows 99 presets to be stored for quick recall.

Data **not** stored in eeprom are the 32x large cv buffer and midi record buffers.

These operations are executed on parallel processors outside the main logic core.

Harmonic core parameters

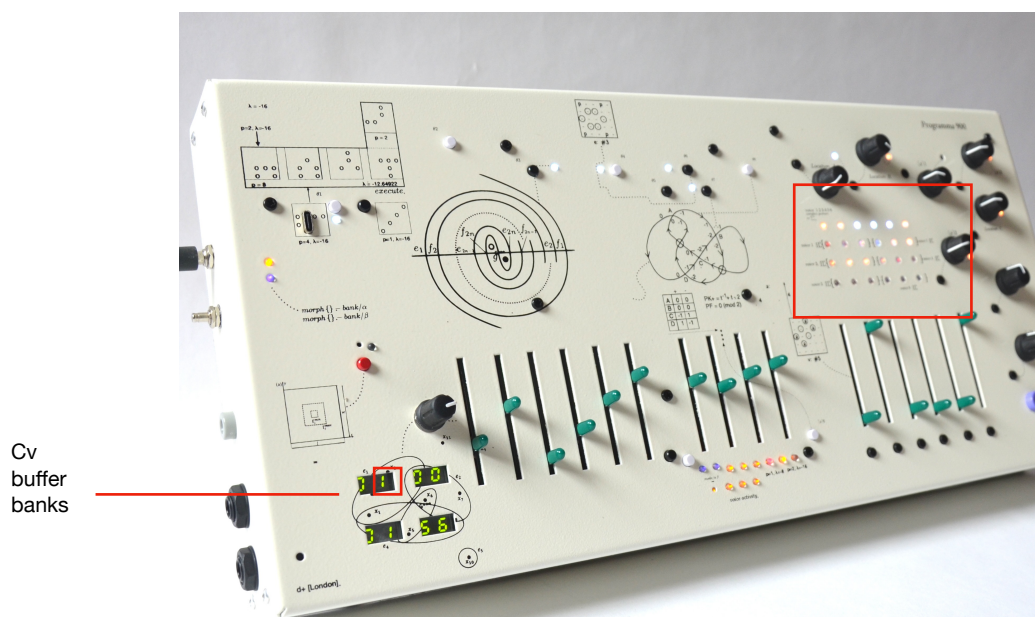


Scanning through voice 0 and Voice 5, the 6 associated sliders individually edit the voices parameters. These will be *odd harmonics*, *even harmonics*, *harmonic partials*, which is the amount of sinusoids added to the voice which can be an arbitrary amount between 0 and over 580, many out of audible hearing by humans, *harmonic tilt*, which is the leaning distribution of the partials in the spectrum, *fundamental frequency tuning and octave*. Each harmonic voice also has a multiplication button for self modulation.

In the 6th voice the 6 associated sliders will control different parameters of the chosen DSP. Parameters and their slider roles are described in full in the DSP pages.

Voice Envelopes, modes, complex gestural cv buffers, modulation destinations.

Programma 900 has x32 gestural cv buffers for every possible modulation destination and a dedicated complex envelope for each voice. These buffers can record gestures up to 5 mins. A global 4 point envelope with 2 modes sit in front of the complex voice envelopes and share a dynamic relationship for achieving not only complex and long envelope shapes but also for global uniformity for polyphonic playing and spectral drum approaches.



Scrolling through the cv buffer banks 1- 4 , these values correspond to the 4 rows of 6 led's.

Row 1 : voice 1 > 6 complex envelopes.

Row 2: voice 1 odd/even/harmonic partials - voice 2 odd/even/harmonic partials

Row 3: voice 3 odd/even/harmonic partials - voice 4 odd/even/harmonic partials

Row 4: voice 5 odd/even/harmonic partials - voice 6 odd/even/harmonic partials

On start up, of the 32 available complex gestural cv buffers 8 will be active whilst the others remain dormant.

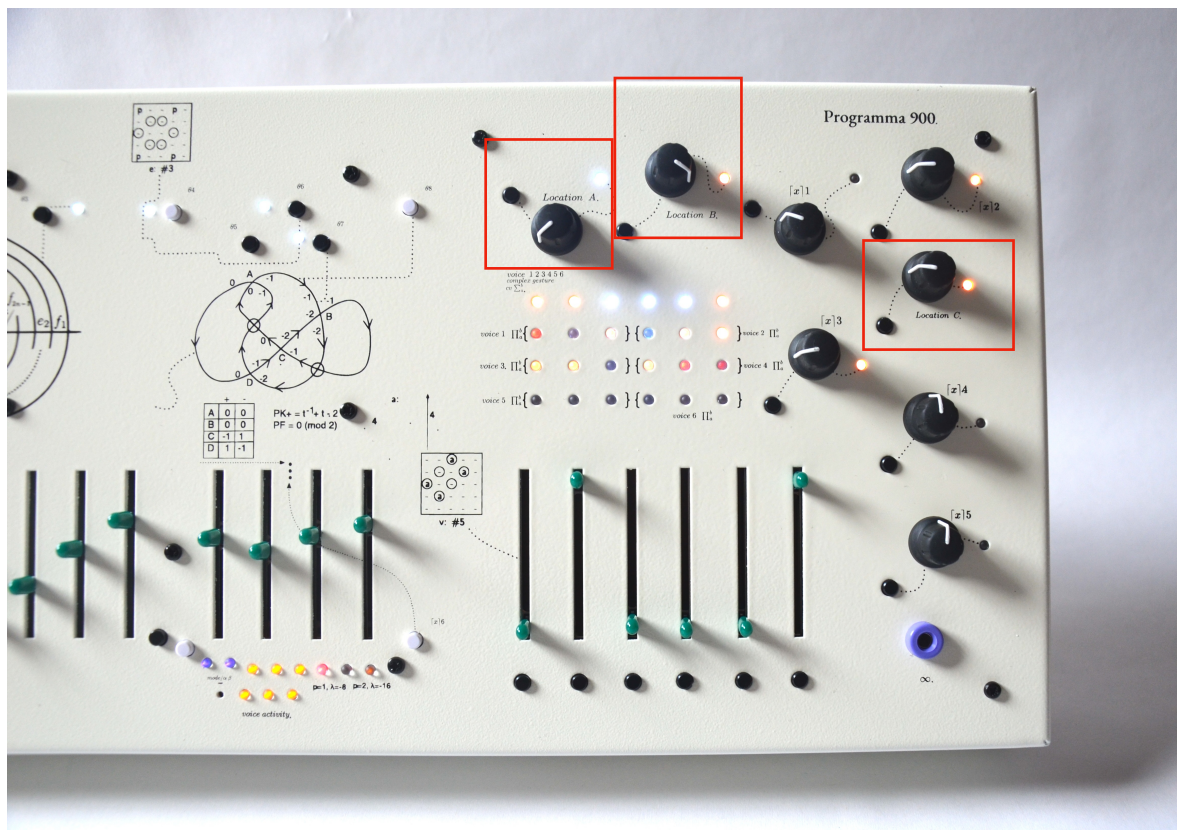
These buffers are the 6 voice envelopes and location a and b buffers.

Location a , b and c are responsible for where the voices are in the stereo field.

Voice 2 and 5 are tied to location A

Voice 1 and 3 are tied to location B

Voice 4 and 6 are tied to location C.



As only 8 buffers are active on start up we will need to instantiate any dormant buffers as needed,

So Let's toggle the location c buffer button once and learn how these buffers operate.

Recording and accessing modes on any of the gestural cv buffers is as follows:

- Toggle once if dormant to waken up
- Press and hold to view a red led blinking, indicating recording has begun,
- record your gesture for cv input and release to begin looping.
- Double press to clear the buffer.

Once a buffer is awake it also has application to attenuate its parameter statically. This will share a relationship between app control and main parameter knob control. This is of special consideration as once a buffer is awake it does not turn off.

Accessing modes for gestural cv buffers:

Once a gesture has been recorded and is looping, you have the ability to access modes.

- press and hold the associated button whilst cv is looping
- by now turning the knob or slider you will see either a red, blue or white led.

White = offset

Blue = attenuate

Red = speed

- Release the button to confirm the mode you would like to enter
- Now to modify the parameter for mode selected, toggle the button once again
- add your desired amount
- Press once again to exit mode back to base looping.

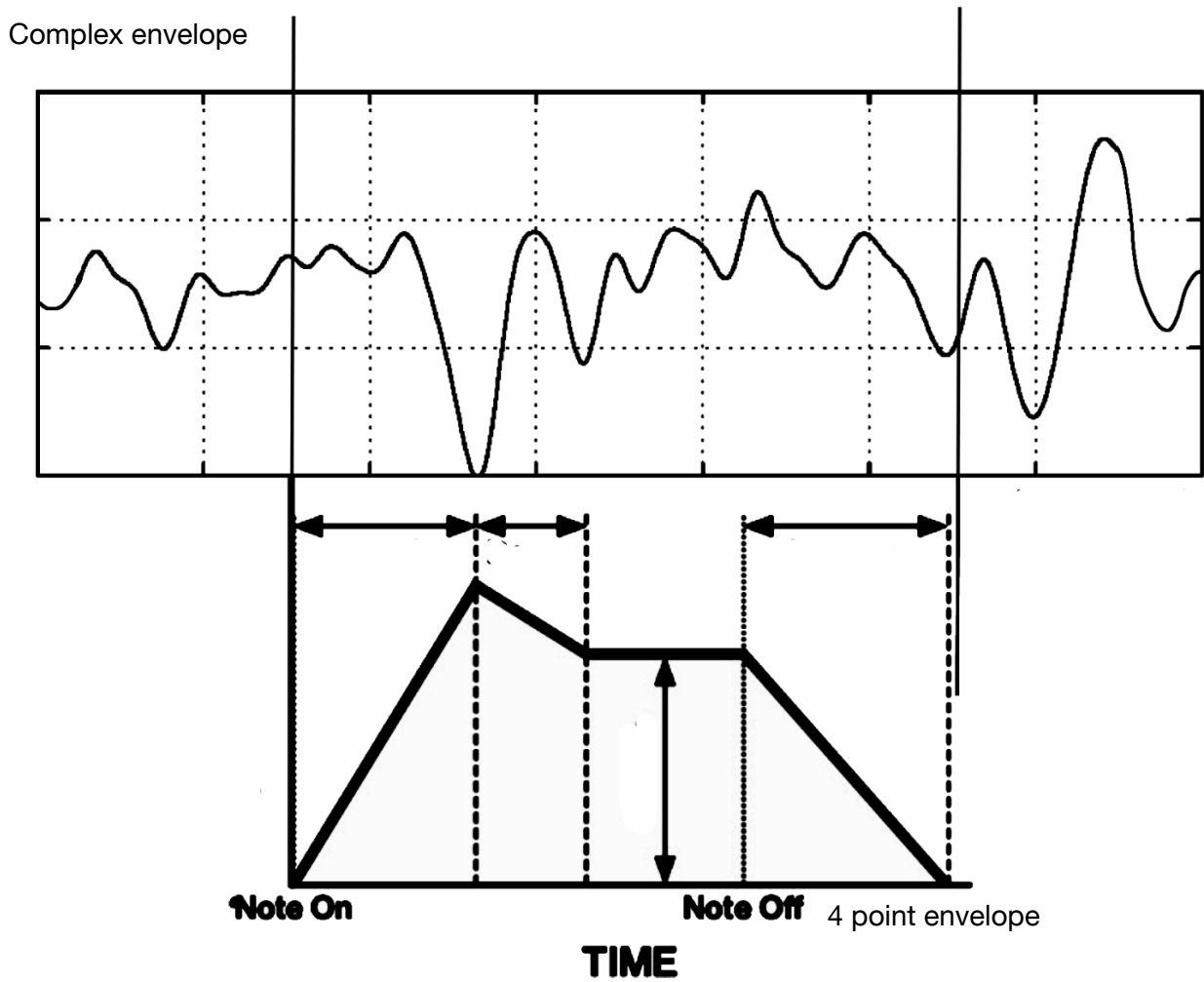
Accessing modes and editing is only applicable once a gesture has been recorded.

2 notes for special consideration:

- if a cv buffer is awake and is not looping it is still outputting a static control voltage, so if you scroll pages to other voice modulation cv buffers, note that this voltage will not be kept unless applied, which is as simple as pressing and holding the associated button to record and store the cv, allowing the cv to set even if not dynamic.
- before you begin recording and looping with these 24 slider related cv buffers you can toggle the associated button again after waking up and have access to either traverse the whole range of the slider or half the range, sometimes useful if you want to pull a complex modulation source quickly or want more detail in how its traversed.

Voice envelope gestural cv buffers and the global four point envelope.

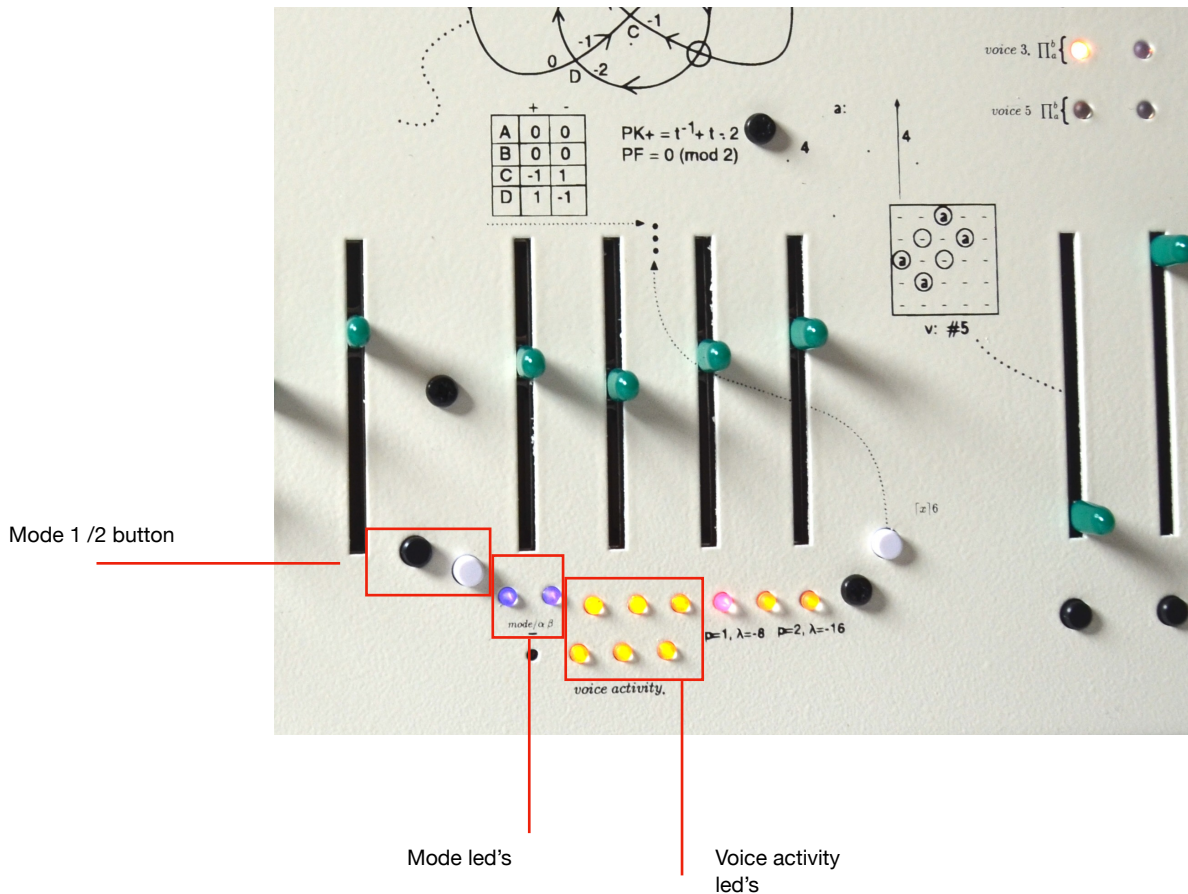
Whether you record a complex envelope buffer or choose to use the buffer as an attenuation output you can view the voice envelopes topology as follows:



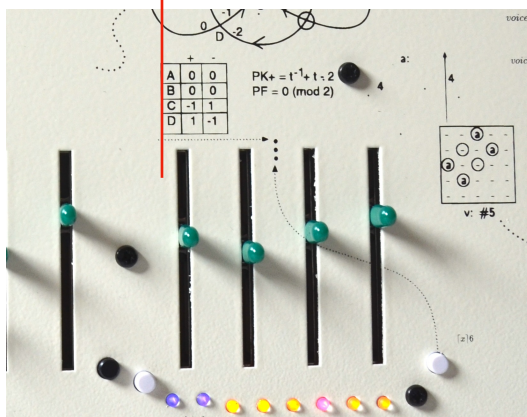
As your complex gestural cv buffer envelope moves through its time looping, we use the simple four point envelope to peer into where the complex envelope is at in its cycle through time, this approach allows for generating stochastic complex envelopes quickly based on your stored data.

The global four point envelope brings a musical uniformity to all voices yet still retains complexity and has 2 different modes.

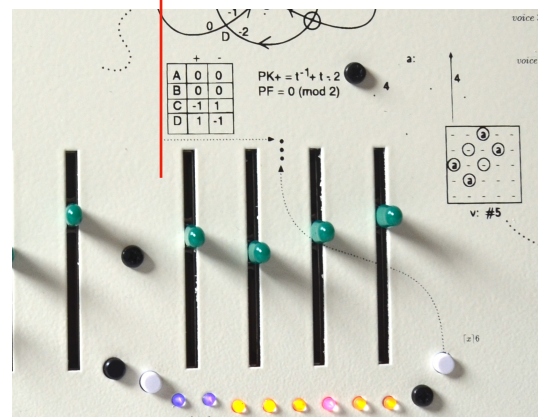
- one shot
- Gate triggered cycle
- Holding down either mode button 1 or 2 will flash the mode led's twice to indicate the mode you are in and are dedicated to 3 voices each.



Mode 1 sliders: attack / decay / sustain / release



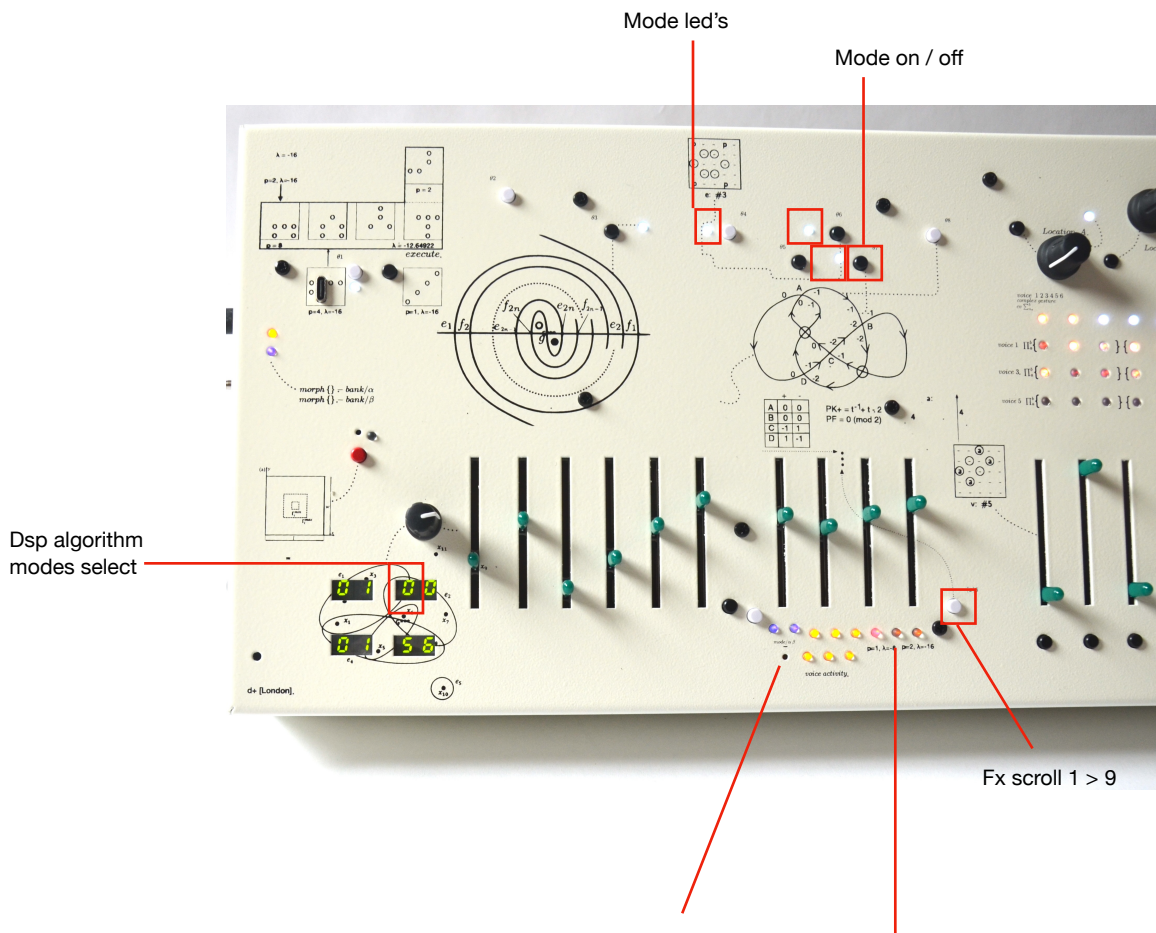
Mode 2 sliders: rate / spread / fm-fade / amplitude



9 DSP algorithms

Programma 900 has a dedicated DSP core with 9 unique algorithms the user can scroll between for timbre exploration.

Each algorithm also holds 3 different modes of operation with in each algorithm.

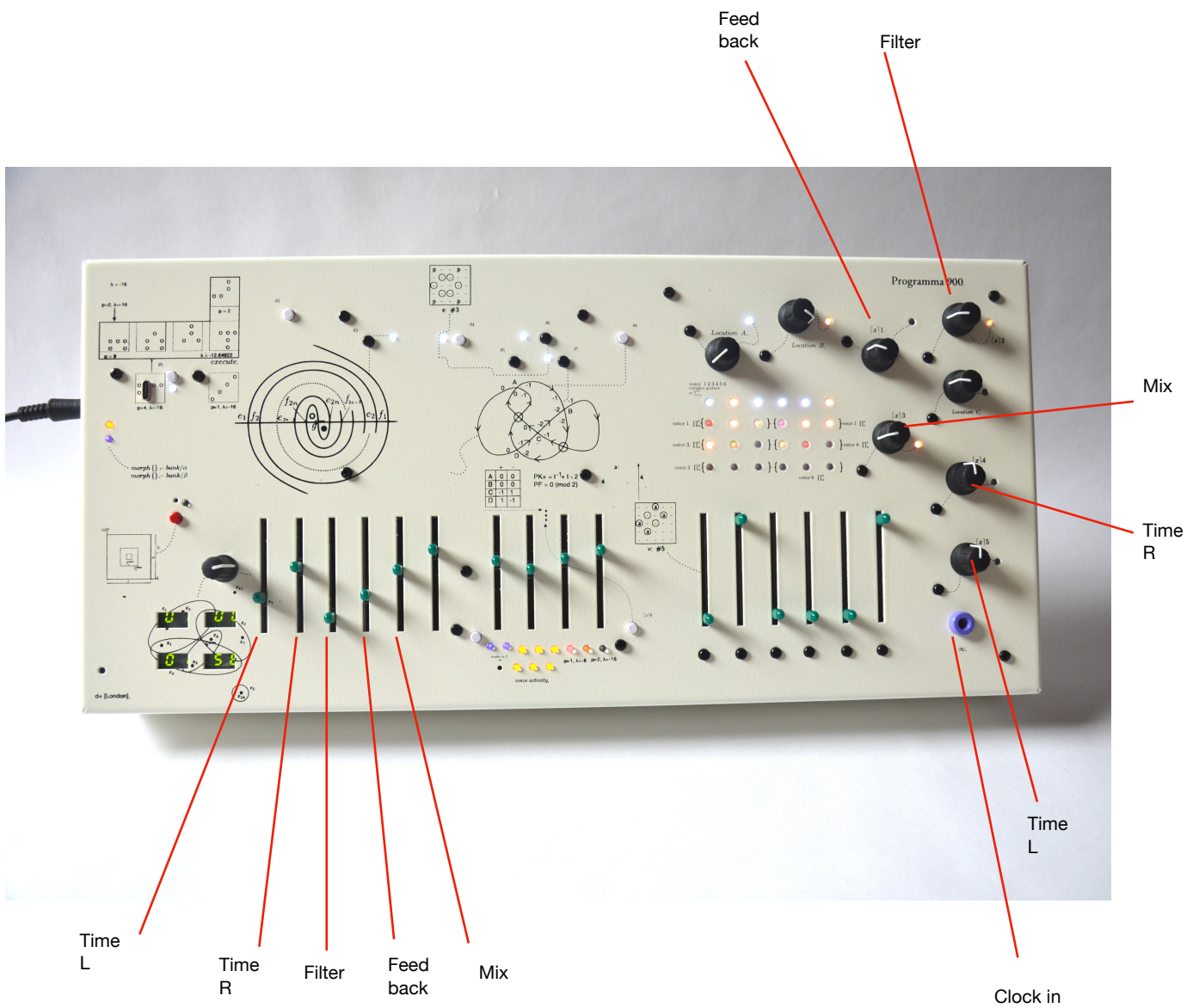


- due to the very large number of processors working in parallel nature on start up sequence, if these lights do not light up in a rare circumstance, simply restart the device or insert and push the restart button in the small hole corresponding to the arrow. This will restart the DSP processor for this part of the device.

DSP Algorithm 1

* dorcrinx time

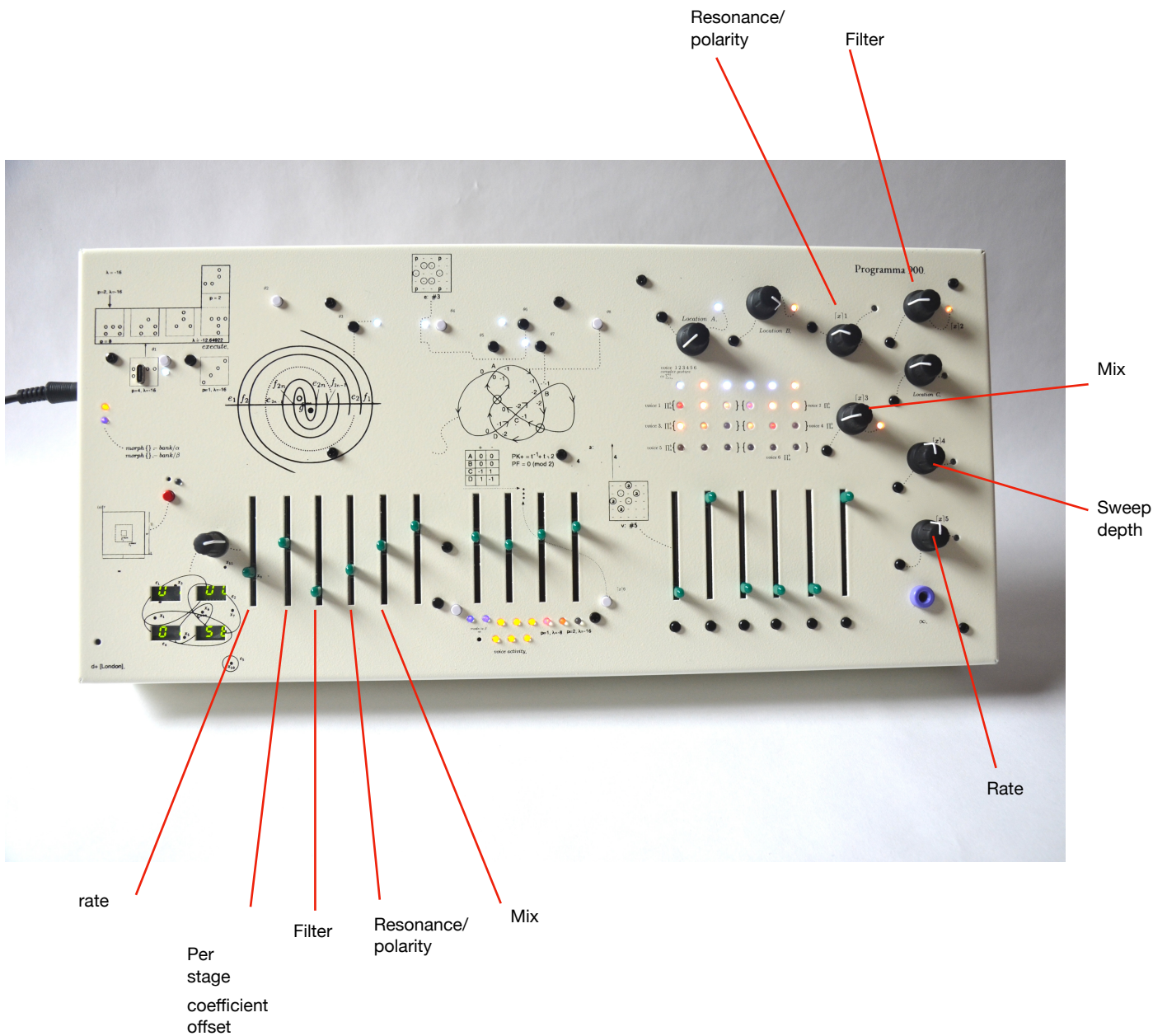
(experimental 6 min regen Delay with 3 modes of time complicating and flanging)



.....

* *Silver tulips*

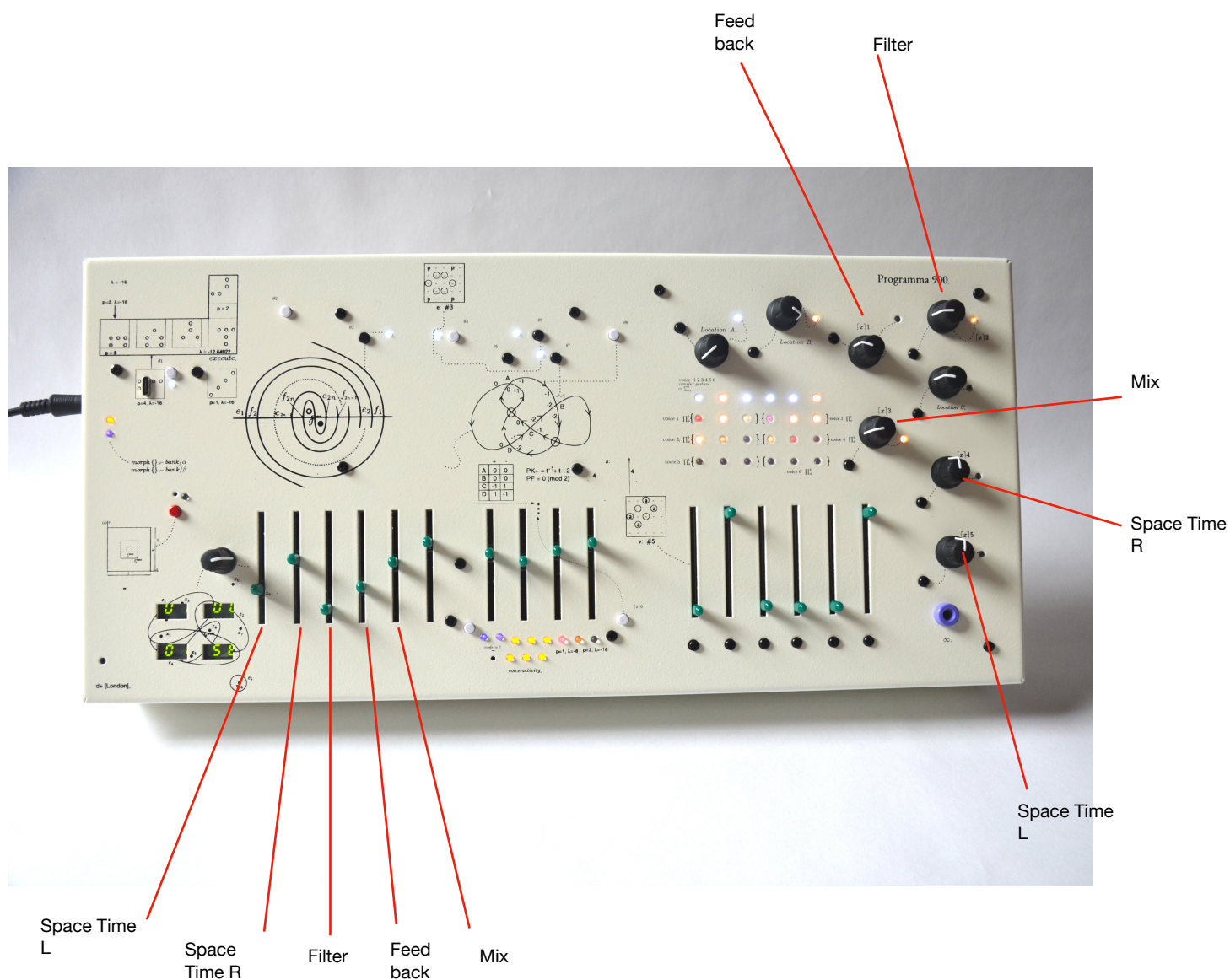
(16 pole phaser with through zero capabilities, Per-stage coefficient offsets and feedback/resonance. 3 modes of varied polarity and offset.)



DSP Algorithm 3

* *loraxagon space*

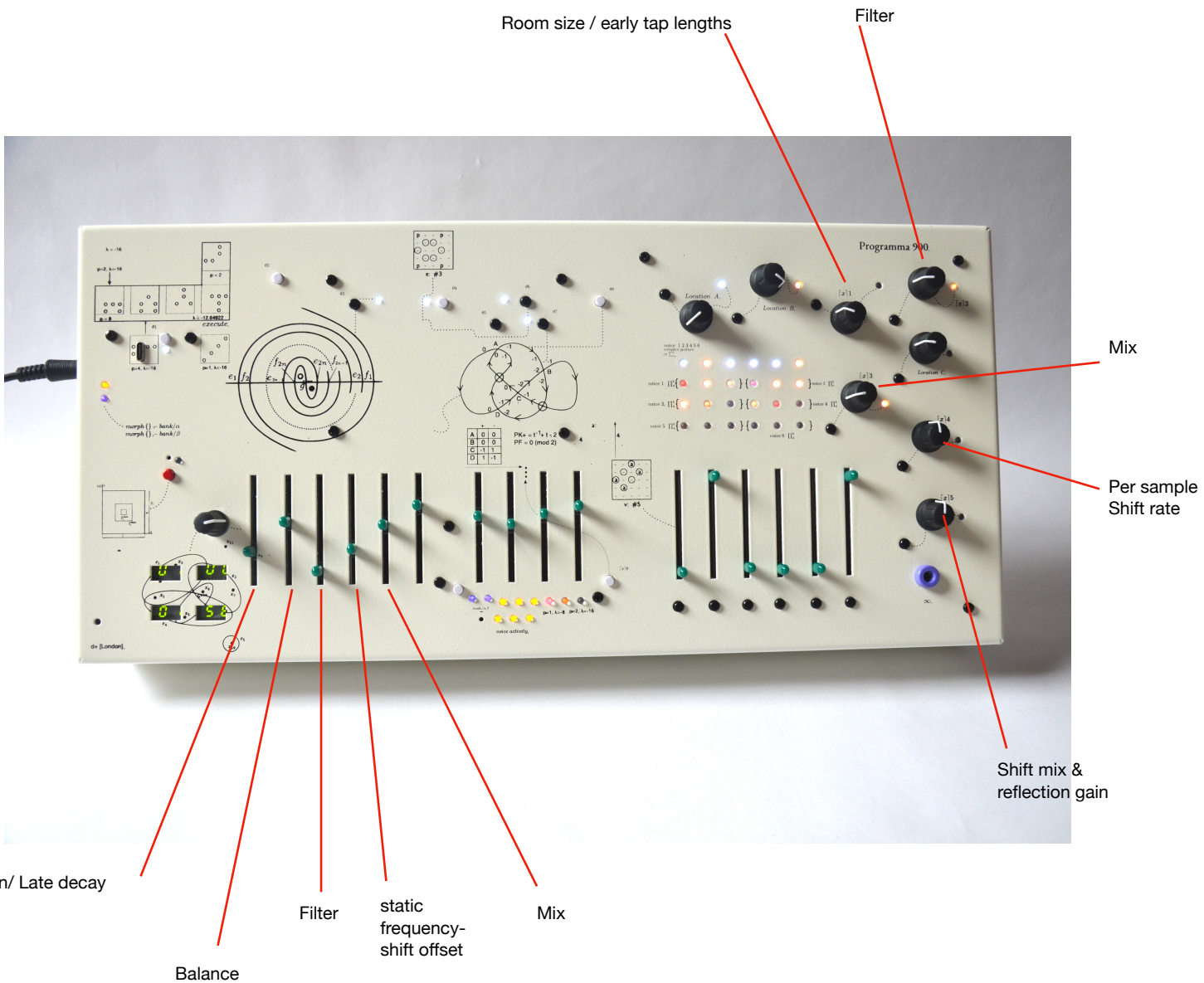
(Hadamard matrix reverb / FDN structure. Soft cushions. 3 modes compromise a reverse, wide and large structures.)



DSP Algorithm 4

* Perelman pearls

(Hilbert transforming FDN / hadamard matrix reverb. Frequency shifting reverb tails.
3 modes of operation.)

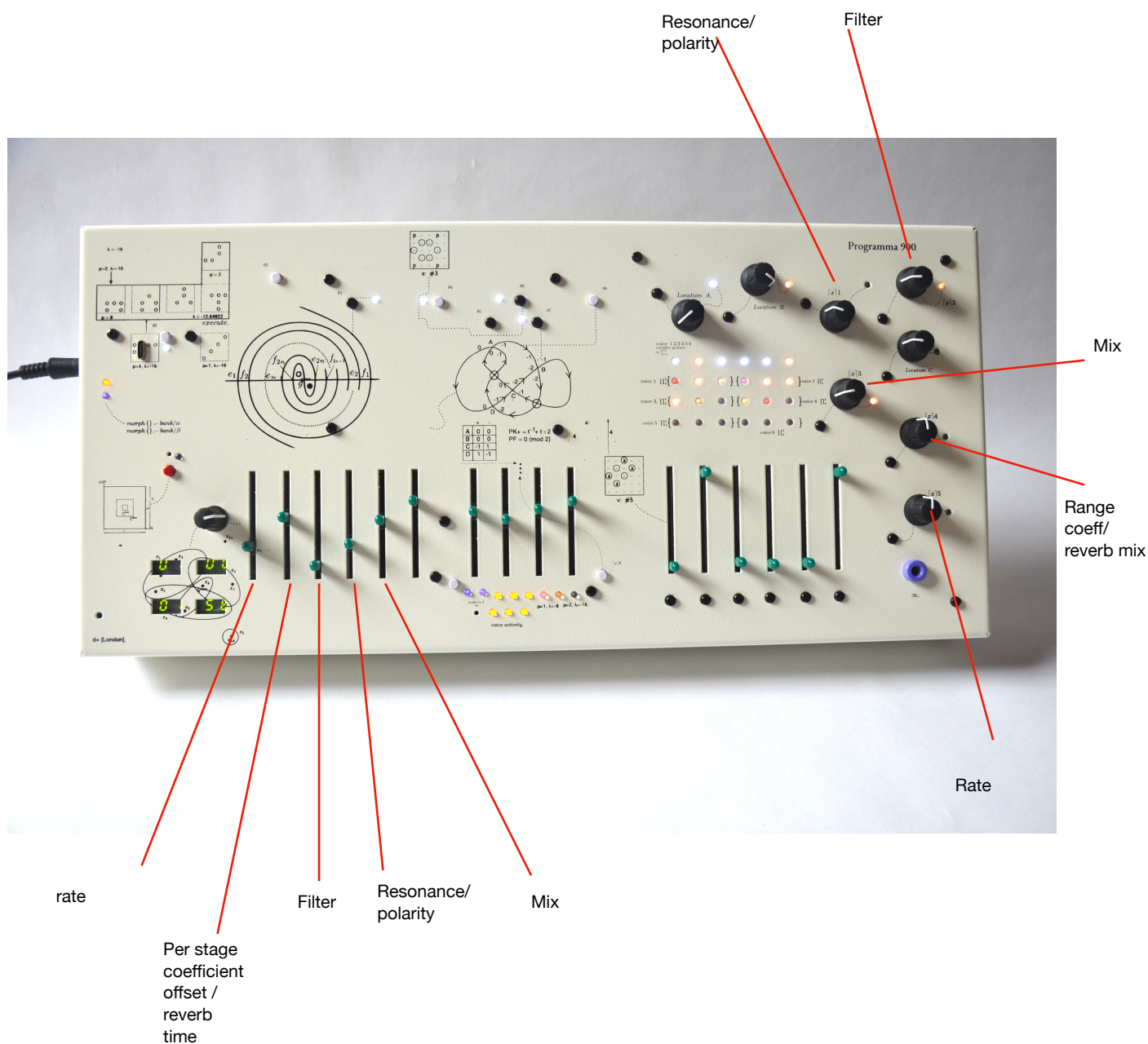


DSP Algorithm 5

* Gorbachev gas

(16 pole phaser with through zero capabilities, Per-stage coefficient offsets and feedback/resonance and 7 nested all pass structure.

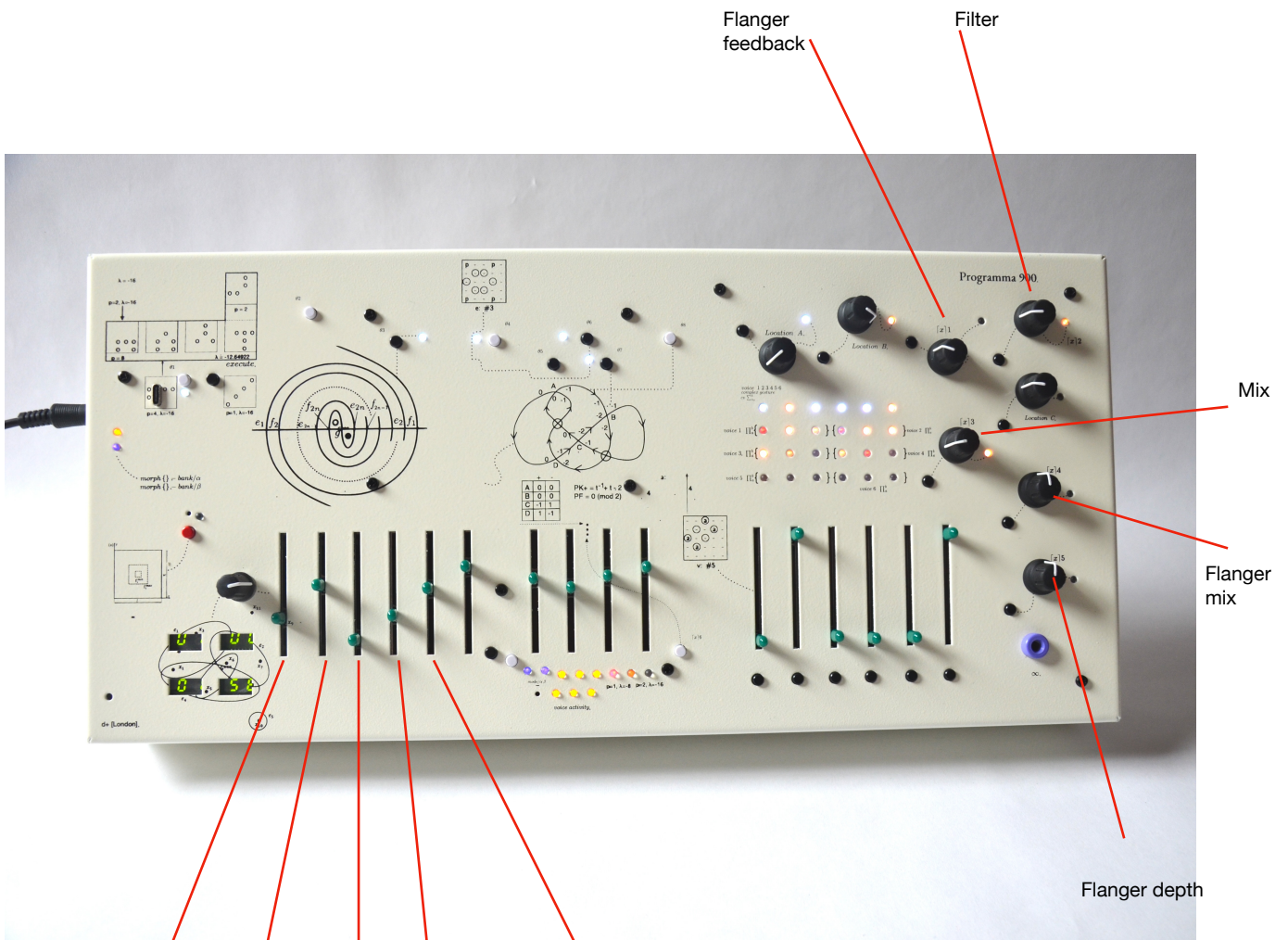
3 modes of varied polarity and offset and combination delay sizes.)



DSP Algorithm 6

*Vector 06-c

(Time stretching through zero flanger)



Frequency

Time stretch

Filter

Once past half way ^ up point recording begins and loop after 12 seconds . To clear bring back to zero.

Mix

Flanger feedback

Filter

Mix

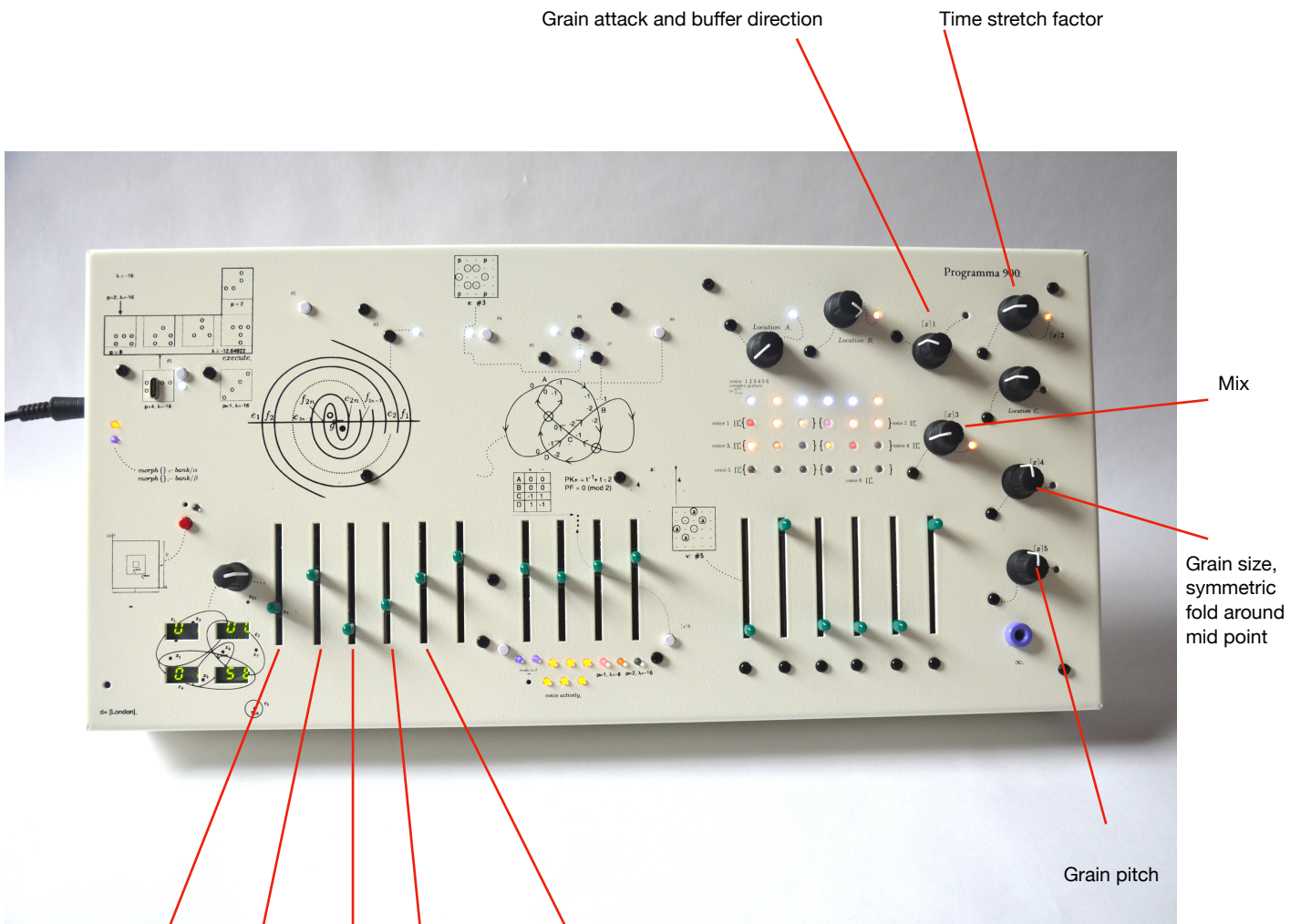
Flanger mix

Flanger depth

DSP Algorithm 7

* *Pentagon2100*

(*time stretching stereo granular algorithm. 3 modes of operation*)



Start position in buffer

Space between spawn

Grain density

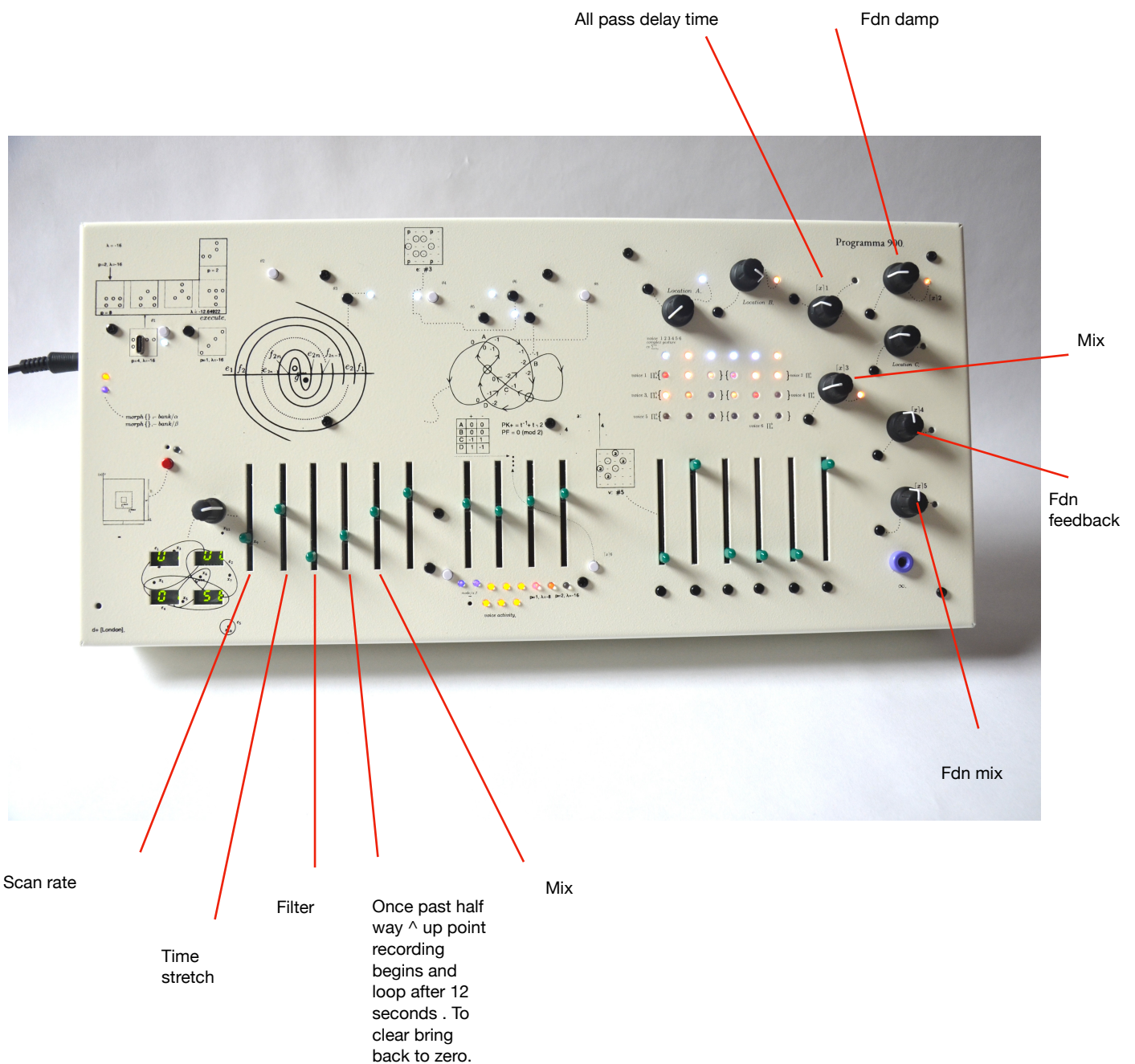
Once past half way ^ up point recording begins and loop after 12 seconds . To clear bring back to zero.

Mix

.....

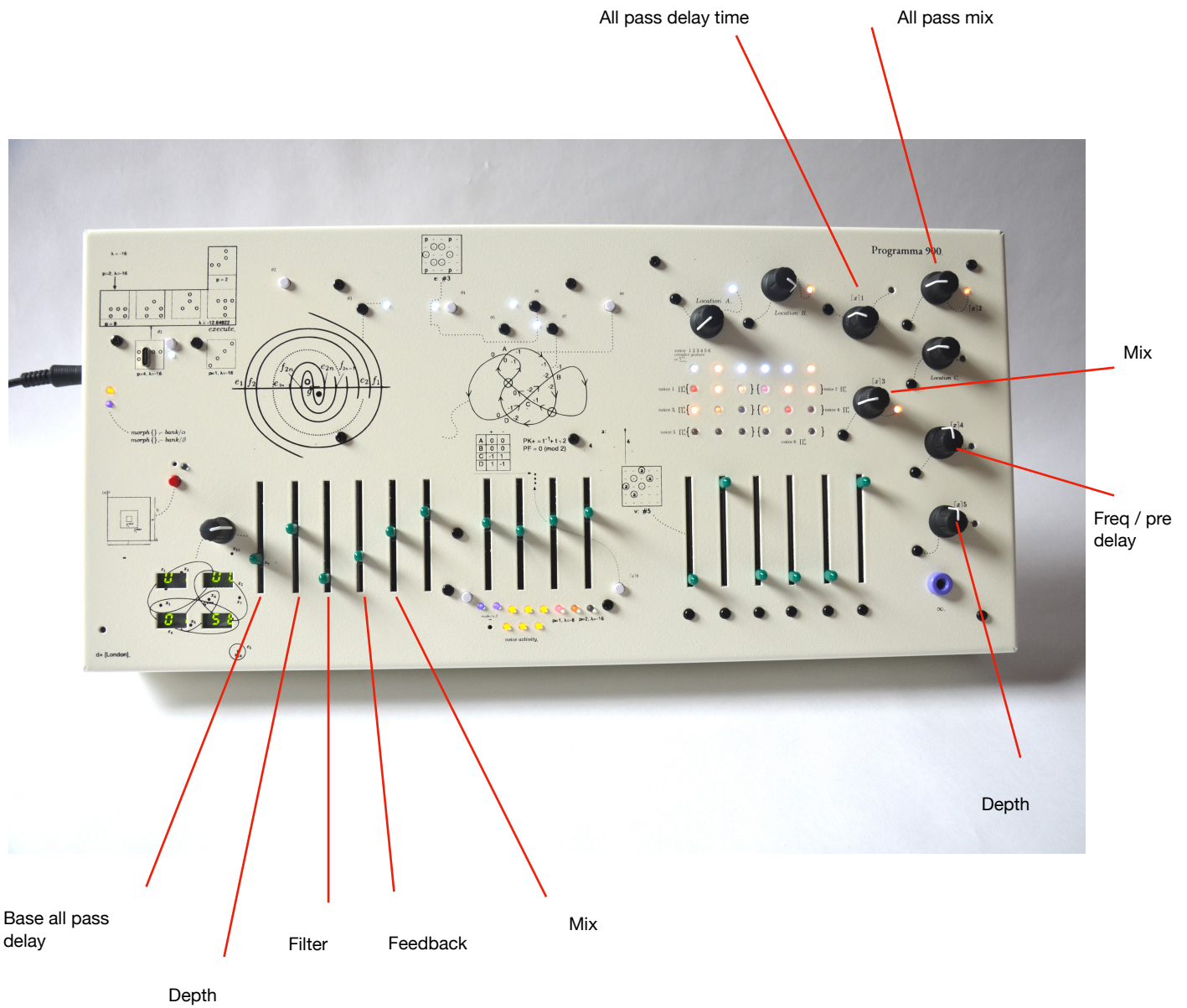
* *UT-88 fortran*

(time stretching buffer scanner / fdn reverb structure)



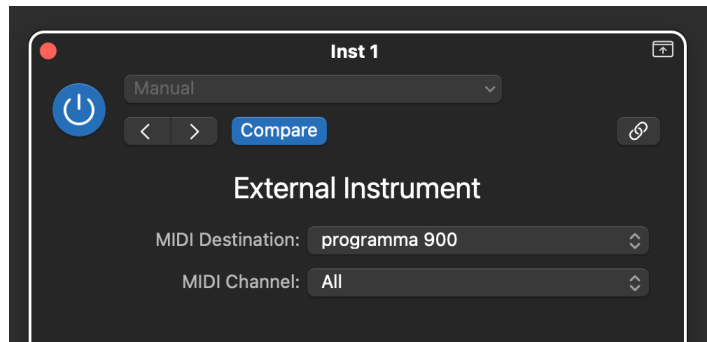
.....

* twin q conjecture
(self modulating through zero scanning)



Midi / daw connectivity

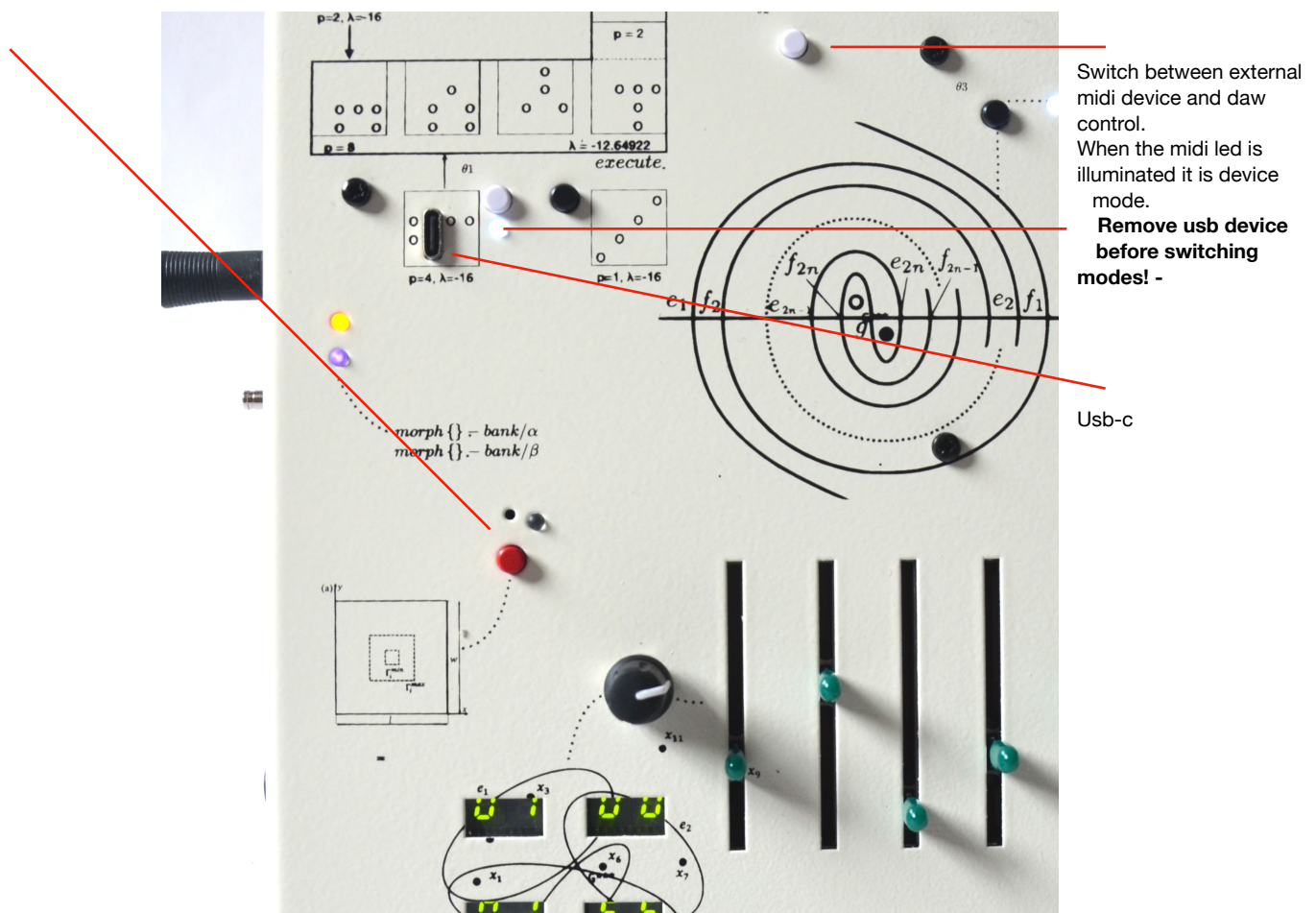
Programma 900 has one usb-c connection for connecting to an external midi keyboard or to your daw/ p900 app. Programma 900 should instantiate connection to your computer and be seen as programma 900. The p900 app facilitates control over all p900 parameters and includes bonus features such as physics mode.



Midi record and loop buffer

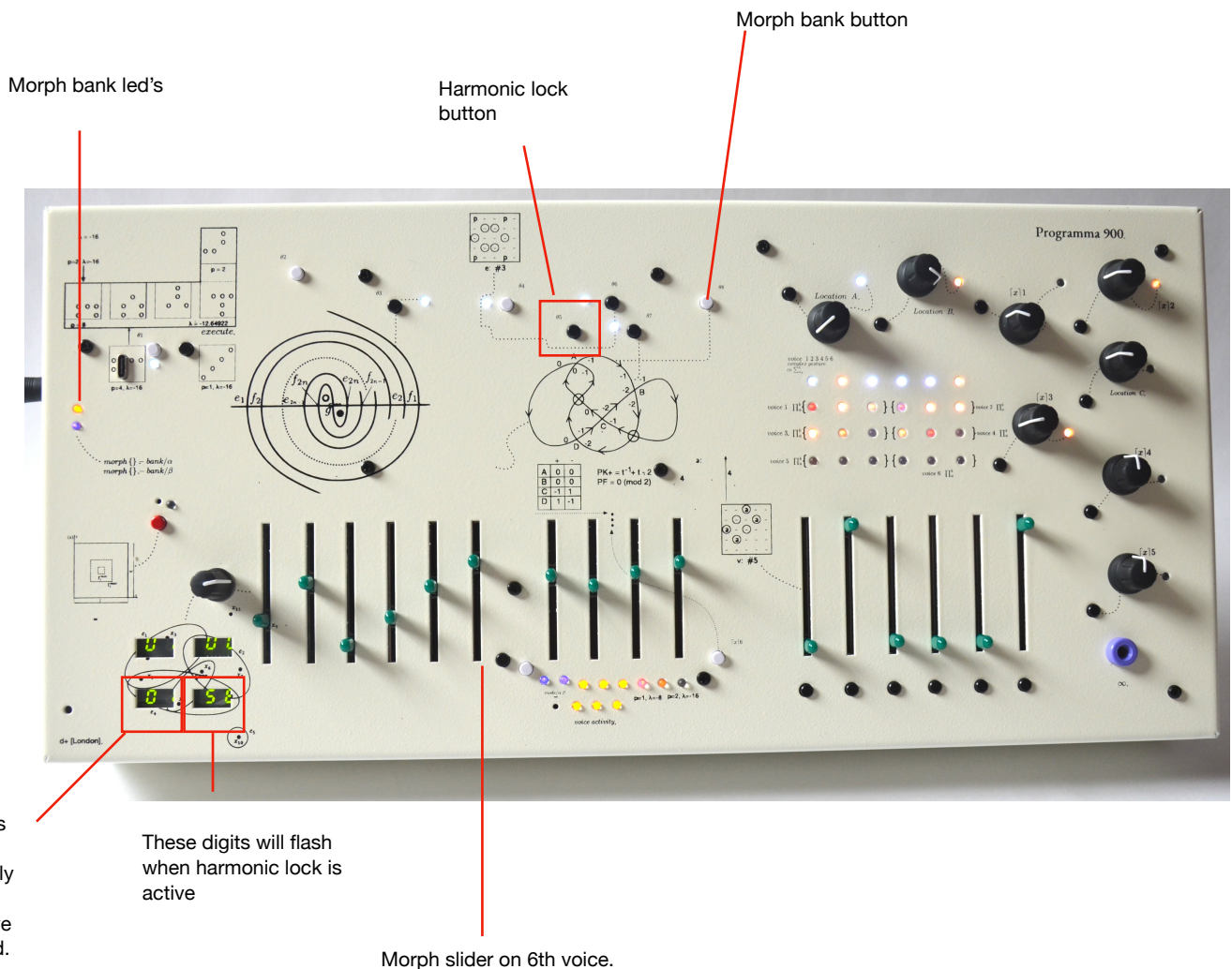
Programma 900 has a 3000 note midi buffer.

This red button is the midi buffer and looper. Press once to arm. it will only begin recording once it registers incoming midi notes, press again to begin looping. Press a third time to clear the buffer. If no midi notes are registered it will disarm. This buffer works with external midi and daw



Spectral state morphing & Harmonic lock

Programma 900 has the ability to capture any 2 spectral states and morph between them. The morph button pressed once will capture any current state and illuminate morph bank 1, pressed again it will capture any spectral state and illuminate morph bank 2. The 6th slider in the 6th voice page is now your morph slider.



Harmonic lock assists in the uniformity of all 6 polytonal voices.

Spectral approaches such as p900 can shine in microtonal settings however having the flexibility to be functional in any musical setting is what harmonic lock is designed for.

When active the harmonic tilt of all 6 voices will lock to **voice ones** harmonic tilt controls.

When holding the harmonic lock button for more than 0.8s will store the current voices tuning controls. This will flash the digits quickly twice to indicate the tuning is stored. Now when harmonic lock is active your stored tuning will override any attempts to change tuning.

When active the last 2 digits displayed will flash to symbolise harmonic lock is active or not flash at all if inactive.

Midi matrix and per note function assign.

Programma 900 has the ability to randomise a matrix of functions and assign them to parameters that get triggered when its assigned note plays. Randomising this matrix and what note it gets assigned to is simple as pressing this button and can be re randomised with each press. When midi matrix is active the digits below will flash. Double tap will turn midi matrix off.

It does **not assign functions to tuning controls.

** double tapping the midi matrix button also calls the gate off function if users experience any midi buffer buildups.*

Dice

The dice button randomises all parameters and there values.

It does **not** randomise any of the 32 cv buffers or tuning controls.

Voice assign modes

Programma 900 has 3 voice assign modes.

Polyphonic stack up : each note linearly climbs the voice tree.

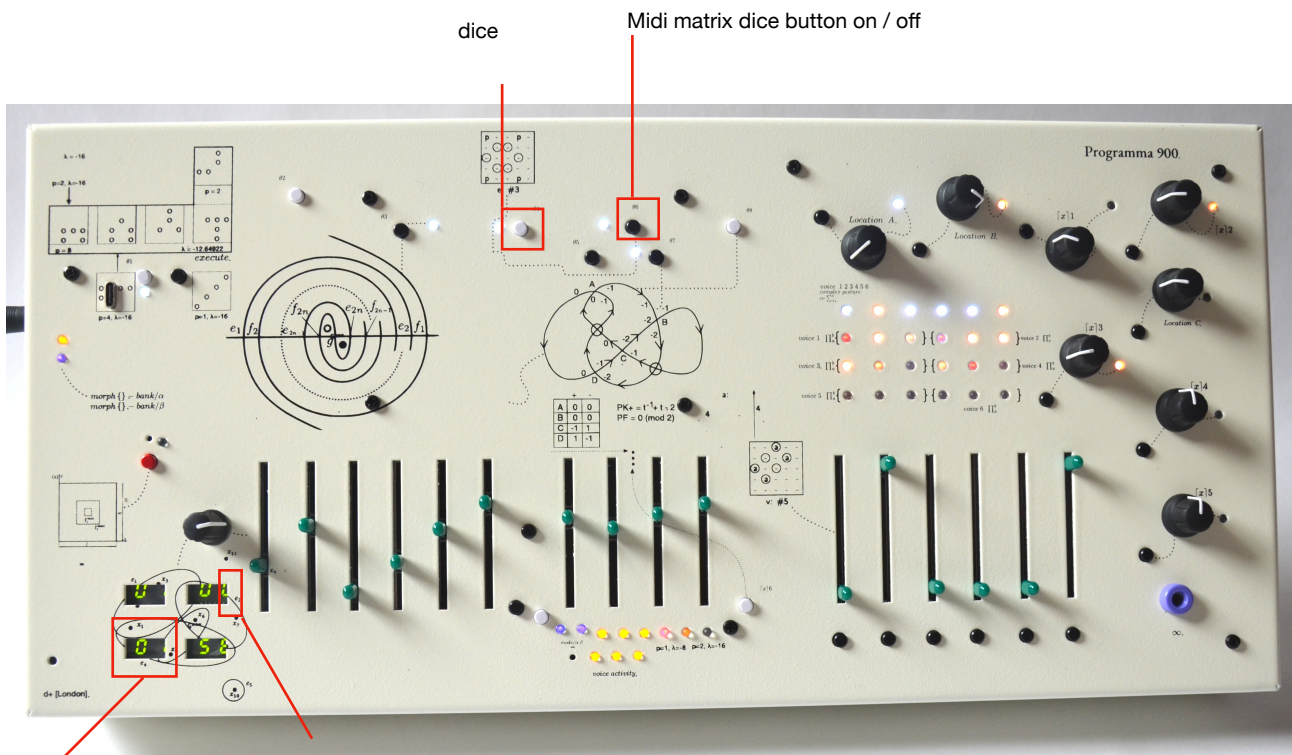
Round robin : each incoming midi note will trigger the next voice in the chain.

Channel assign : each voice is assigned a midi channel for independent voice control.

P900 APP

The p900 app opens all the parameters of p900 and more.

Available for OSX min 14.0 and all other platforms in the chrome browser.



dice

Midi matrix dice button on / off

These digits will flash when
midi matrix is active

Voice assign mode 1 - 3



12v/5a/2.1mm centre
positive psu.

On / off

Ground

Left right out