

SYNTHR



Le SYNTHR4

4-channel paraphonic synthesizer with MIDI control, arpeggiator, built-in sequencer, interactive step sequencer, modulation matrix memory, dual effects and stereo output.

User Manual

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WELCOME

Thank you for purchasing the SYNTHR4, and thus supporting the French electronic lutherie.

This project follows the SYNTHR3 where I wanted to push the approach by using more modern components offering more possibilities. Jean Luc LARTIGUE (oZoe.fr) took the opportunity to push further the ergonomics via a small color screen and brought a higher power that you will discover along this manual. Yves USSON has been associated to this project for the programming of the effects.

I would like to thank Laurent Cartaux for his precious help on the SYNTHR4 skin.

And I will finish my thanks for my wife and yes once again who let me have full freedom on long hours of development and tuning.

I strongly advise you to read this manual at least once if you don't want to have a surprise like not hearing anything on the way out.

We wish you long hours of research and music for your greatest pleasure.

[https:// www.synthr.fr](https://www.synthr.fr)

Rémy WASELIN

The presets were developed with the use of a SEM filter in channel 1 and an LP 2144 filter in channel 2 by Kurtz Mindfield and SynthR.

They are there to guide the user who can modify them, save them to a new location. The patches when loaded call the operating mode with which they were made. You will find some patches that call the arpeggio mode, or paraphonic mode, or sequencer mode, in which case the corresponding sequence will be loaded as an example. It is quite possible to modify the sound of a sequence and make another patch out of it.

See the Patches Book at the end.

The demo sequences were developed by Kurtz Mindfield.

CONNECTIONS

Back :

- Channel 1, Channel 2 outputs: 6.35 line level jack
- CV1, CV3, outputs: corresponding to VCO1 and 3. 3.5mm jack -1V to +7V with master tune at 440Hz or -2V to +6V or 0V to 8V, impedance 1Kohm
- VCA envelope gate, VCF 2 envelope gate, outputs: 3.5mm jack 0-5V impedance 1Kohm
- Clock: 3.5mm jack TTL compatible clock available in Arpeggiator and Sequencer mode, 0-5V, 1Kohm impedance
- USB type B MIDI socket: Processor firmware update and MIDI control by software
- USB type A socket called Host to connect a USB keyboard
- MIDI Polychain Din 5 pins : Used to connect several SYNTHR4 or SYNTHR3 to increase the polyphony. Also allows to make MIDI Out and to send a MIDI clock.
- Mains socket: IEC - 240 V AC 50Hz only, equipped with a 315mA timed fuse or 500mA fast.

Front :

- MIDI IN Din 5 pins: keyboard or sequencer input
- MIDI THRU Din 5 pins: Repeat of the MIDI IN socket.

Dimensions : 625mm*485mm*225mm

Weight : 14 kg

Power consumption : 40 VA

WARNING

Although you can open the rear panel to change a filter, it is forbidden to intervene on the power supply, as the presence of electrical voltage can cause risks of electrocution.

Use a standard power cord.

INTRODUCTION

The SYNTHR4 is an analog synthesizer with subtractive synthesis and MIDI controls.

The VCOs of the SYNTHR4 are controlled by a processor that adjusts the frequency on demand: Autotune function.

In a historical modular synthesizer, the patches are realized by cables that link the modules together. For the SYNTHR4, no cables, but push buttons that connect the modules together. This makes the connections between modules more readable. These push buttons are digital switches and can therefore be stored in profiles called "Patch".

Although pre-wired, the choice of modulations remains important.

The MIDI control is done through a MIDI to CV and Gate converter which receives a MIDI master keyboard.

To take advantage of the SYNTHR4 this keyboard should have: pitch bend, modulation wheel, aftertouch and velocity and a sustain pedal.

The MIDI converter can also be controlled by a MAO software.

The Arpeggiator part and the Sequencer part of the SYNTHR4 will be able to receive a MIDI clock and the associated "Synch 24" commands via the DIN socket.

SYNTHR4 consists of from left to right:

- The oscillator section consists of 4 VCOs. VCOs 1 and 3 are identical as well as VCOs 2 and 4, they will be detailed later.
- VCOs 1 and 3 each have a SUB oscillator and a Super SAW
- A modulation section with two LFOs, the LFO1 which can be MIDI synchronized and the LFO2 with more possibilities, both digital with 16 modifiable waveforms including a Sample and Hold and a noise generator. These LFOs can be frequency modulated by an LFO3.
- A Ring Modulator between the different VCOs.
- A white and pink noise generator.
- An independent portamento on each VCO.
- An effects section acting on each of the 2 output channels.
- An overall MIXER that allows you to send each of the 8 available sources to the VCF1 and/or VCF2.
- Underneath are the controls of a 3rd LFO, partly controlled from the screen.
- At the bottom we find a general volume.
- The filter section with a low-pass or multimode VCF1 and a low-pass or multimode VCF2*.
- Below we find 2 VCAs with automatic panning or not.
- 3 envelope generators, one of which is used as a modulation for the VCOs and the LFO1, one for the VCFs and one for the VCAs.

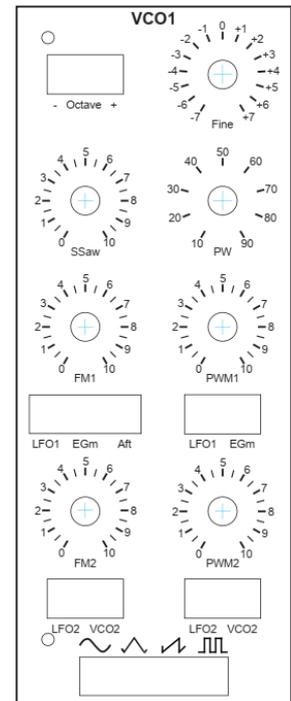
We have done the tour of the analog part and we arrive on the controller with its graphic screen which will allow us to control the various modes of play, the MIDI channel if necessary, the Tuning fork, to save "patches" and to activate the internal Arpeggiator as well as the Sequencers and many other settings. Equipped with seven buttons and a rotary encoder, this controller allows all possible actions of the synthesizer. It has no effect on the audio synthesis.

THE SOURCES

The VCOs are based on the SSI2130 circuit of great integration which naturally offers a very good slope of 1V/octave over several octaves. However, this synthesizer is equipped with an Autotune which allows to keep its accuracy on the tessitura.

VCO1 AND VCO3:

- Octave selector on + or - 2 octaves, by successive presses.
- Fine tuning on + or - 2 semitones to + or - 12 semitones, (configurable in the Settings menu).
- Keyboard tracking via MIDI to CV including the pitch wheel of + or - 1 tone (configurable in the Settings menu).
- Adjustment of the SuperSAW *intensity in the SAW. Potentiometer at 0 : Standard Saw.
- Adjustment of the pulse width (PW) 10 to 90%.
- Frequency modulation by :
 - Adjustable input 1: LFO1 or Modulation Envelope or Aftertouch (if the keyboard delivers it).
 - Adjustable input 2 : LFO2 or VCO2 (Cross modulation).
- Pulse Width Modulation (PWM):
 - Adjustable input 1: LFO1 or Modulation Envelope.
 - Adjustable input 2: LFO2 or VCO2 (Cross modulation)
- Simultaneous outputs possible : Sine, Triangle, Sawtooth, Pulse



* SuperSAW is an addition of original saw plus one saw moving at 0.1 Hz plus second one animated by LFO2 if On

VCO2 AND VCO4:

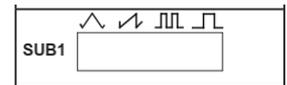
- Octave selector on + or - 2 octaves,
- Fine tuning on + or - 2 semitones to + or - 12 semitones, (configurable in the Settings menu).
- Keyboard tracking via MIDI to CV including the pitch wheel of + or - 1 tone (configurable in the Parameters menu).
- Synchronization of VCO2 on VCO1 and VCO4 on VCO3
- Adjustment of the pulse width (PW) 10 to 90%.
- Frequency modulation by :
 - Adjustable input 1: LFO1 or Modulation Envelope or Aftertouch (if the keyboard delivers it).
 - Adjustable input 2 : LFO2 or VCO2 (Cross modulation).
- Pulse Width Modulation (PWM):
 - Adjustable input 1: LFO1 or Modulation Envelope.
 - Adjustable input 2: LFO2 or VCO2 (Cross modulation)
- **Continuously variable output:** Triangle, Sawtooth, Pulse that can be controlled by the LFO2 or the modulation envelope.



To perfect your knowledge of VCOs you can view the tutorial N°1, VCO at: [Médias | SynthR](#) or [SynthR4 - Tuto 1](#) : [Les VCO - YouTube](#)

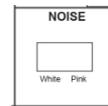
SUB1 AND SUB2 :

- Output at octave -1 of VCO1 and VCO3: Triangle, Sawtooth, Square
- Output at octave -2 of VCO1 and VCO3: Square



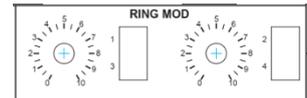
NOISE

- White noise
- Pink noise .



RING MODULATOR

- Between VCO1 and VCO2 or VCO4 measurable or between VCO3 and VCO2 or VCO4.



See tutorial N°3 for this section: [Médias | SynthR](#) or [SynthR4 - Tuto 3 : Le reste de la façade gauche - YouTube](#)

MIXER

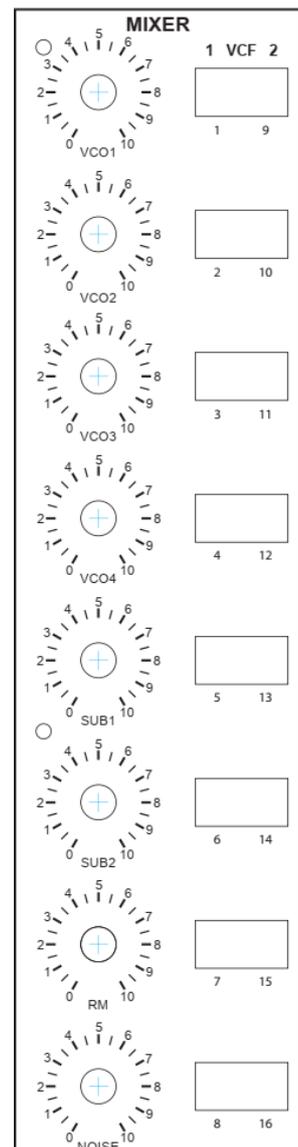
- Each of the above sources can be sent to VCF1 and/or the VCF2.



If no VCF1 or VCF2 destination is engaged, there will be no output sound.

Depending on the game modes chosen, choices will be indicated and sometimes not modifiable.

After pressing the " SHIFT " key below the screen, the VCF1 and VCF2 assignment buttons change their role and become note activation buttons of the Step sequencer, as we shall see later.



FILTERS

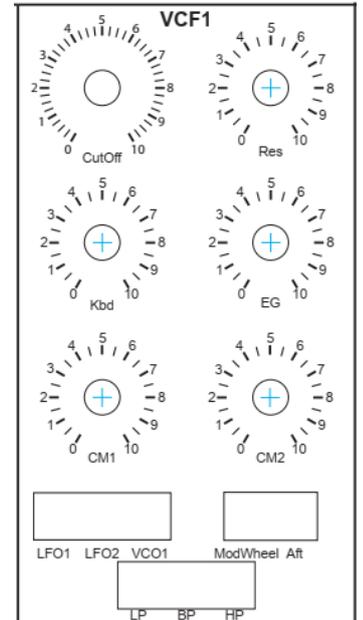
The VCFs are either discrete circuits or integrated circuits (like the AS3320 or the SSI2144) using known schematics, but in no case will they be clones of the components. It is therefore possible that some people will not find the grain, the fineness, the harmonic range or even the known defects of these famous filters.

VCF1 AND VCF2:

Suggested choices see Appendix 2.

- Cutoff
- Resonance
- Keyboard tracking 0 to 120%. The 100% is between 8 and 9.
- Dedicated Envelope input
- Adjustable modulation input 1 : LFO1 or LFO2 or VCO1.
- Adjustable modulation input 2 : Aftertouch or Modulation wheel
- Low Pass, Band Pass, High Pass selection for multimodes only

From one filter to another, the **cutoff** and **resonance** potentiometers can have different behaviors, especially at the end of the run.



- When a Low-Pass only filter is inserted the BP and HP buttons are inactive

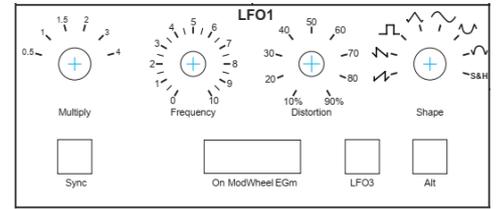
- For some multimode filters, the mixing of modes is possible, for example LP and HP. This is valid for the so-called SVF or state variable filters. Other multimode filter will not allow this mixing.

MODULATIONS

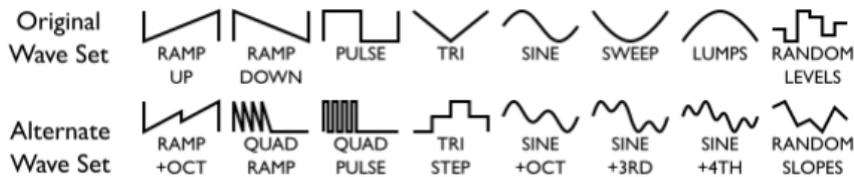
The LFOs are generated by digital ICs for LFO1 and 2. The LFO3 is generated by the controller.

LFO1

- Multiplication selector: 6 frequency ranges
 - **0,5** from 0,025 to 6,4 Hz
 - **1** from 0,05 to 12,8 Hz
 - **1,5** from 0,075 to 19,2 Hz
 - **2** from 1 to 25,6 Hz
 - **3** from 1,5 to 38,4 Hz
 - **4** from 2 to 50 Hz



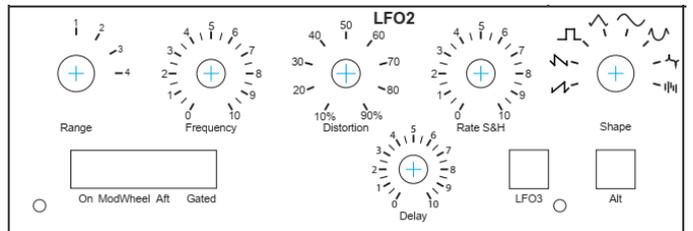
- Frequency potentiometer.
- Waveform distortion potentiometer (see below):
- Waveform selector among 8 and 8 more by pressing "Alt". The last position is a **Sample and Hold**



- Sync button with the internal clock which can be internal to the controller, the LFO2 or MIDI
- LFO On button: without it no output. The LED indicates the frequency.
- Button for triggering the LFO with the Modulation Wheel. The LED indicates the frequency.
- Buttons for triggering the LFO by the modulation envelope. The LED indicates the frequency
- Button for activating the LFO3 see below (partly controlled from the screen) which modulates the frequency of LFO1

LFO2

- Range selector: 4 frequency ranges
 - **1** from 0,05 to 12,5 Hz
 - **2** from 0,1 to 25 Hz
 - **3** from 0,2 to 50 Hz
 - **4** from 0,4 to 100 Hz



- Frequency potentiometer
- Waveform distortion potentiometer:
 - Examples :

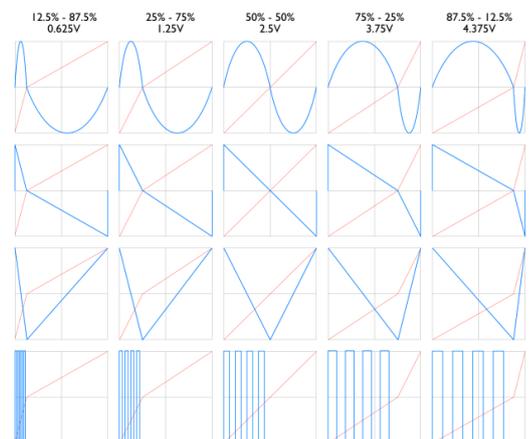


The position respecting the waveform is at 12 o'clock or 50% otherwise the waveform is distorted. In the case of the square waveform, this potentiometer acts on the duty cycle (PW).

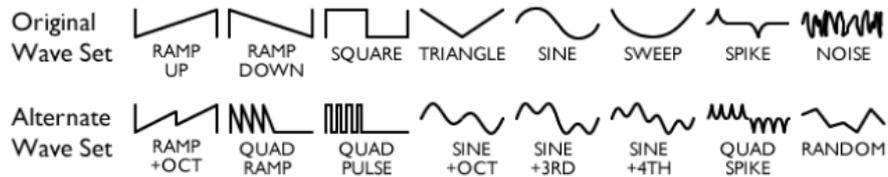
- Sample & Hold sample rate potentiometer acting on any waveform in addition to noise.



Make sure that this potentiometer is set to 0 when you are not using the S&H, otherwise the LFO will not function properly.



- Waveform selector among 8 and 8 more by pressing "Alt».



- LFO On button: without it no output. The LED indicates the frequency.
- Button for triggering the LFO with the Modulation Wheel. The LED shows the frequency **only** on the action.
- Button for triggering the LFO with the Aftertouch. The LED shows the frequency **only** on the action.
- Button for triggering the LFO by a keyboard Gate with adjustable delay from 0 to 3 seconds. The LED shows the frequency **only** on the action..

LFO3

- Activation by the LFO3 button under the screen. Choice of the waveform by dedicated menu on the controller : sine, sawtooth, inverted sawtooth, triangle, square, random and variable.
- Frequency adjustable from 60s to 500Hz.
 - 2 frequency ranges on the screen.
- Adjustable level.



This LFO can modulate LFO1 and LFO2 as well as the VCA panning.



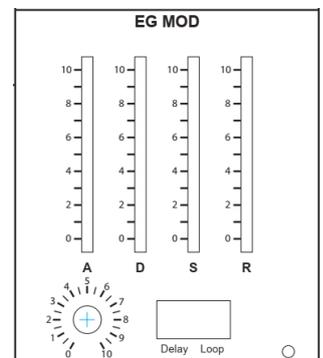
To perfect your knowledge of LFOs you can view the tutorial N°2, LFO at: [Médias | SynthR](#) or [SynthR4 - Tuto 2 : Les LFO - YouTube](#)

The envelopes are generated by digital integrated circuits associated with other components.

ADSR MODULATION (EG MOD)

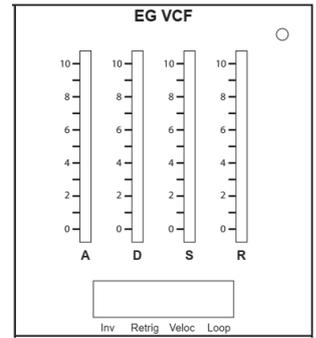
- ADSR type envelope generator for frequency or duty cycle modulation of VCOs or envelope for LFO1 and waveform change on VCO2 and 4.
 - Possibility of delay from 0 to 3 seconds with respect to the keyboard Gate by the Delay button.
 - The Loop button allows you to repeat the ADSR cycle of the envelope which becomes an LFO whose frequency depends on the setting of the knobs.

* We will see that this envelope can change its role depending on the game mode (see below).



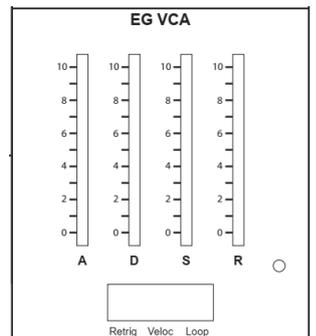
ADSR FILTRE (EG VCF)

- ADSR envelope generator for VCF cutoff frequency modulation.
 - The Inv button is used to invert the envelope which can be interesting for BP or HP modes.
 - * A jumper at the back allows either a negative or a positive inverted envelope (by default) (appendix 6).
 - The Retrigger button allows you to play with each note press to restart the AD cycle.
 - The Velocity button allows you to play on the amplitude of the whole envelope according to the velocity supplied by the MIDI keyboard. It is up to the keyboard to provide the right response curve.
 - The Loop button repeats the ADSR cycle of the envelope.



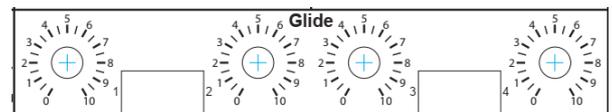
ADSR VCA (EG VCA)

- ADSR envelope generator for VCA modulation.
 - The Retrigger button allows you to play with each note press to restart the AD cycle.
 - The Velocity button allows you to play on the amplitude of the whole envelope according to the velocity provided by the MIDI keyboard. It is up to the keyboard to provide the right response curve.
 - The Loop button repeats the ADSR cycle of the envelope.



PORTAMENTO OR GLIDE

- The adjustable portamento can be applied to all VCOs.



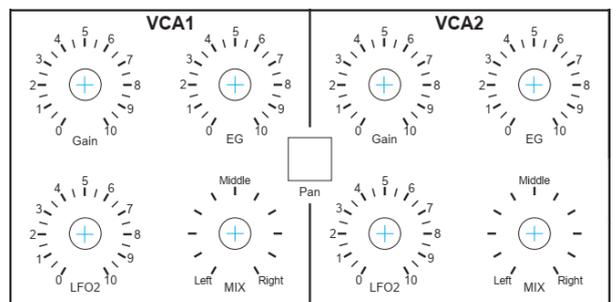
OUTPUTS

VCAS

Special feature of VCA1: It receives the Tuning Fork when it is activated via the control screen (see below), and in this case open the gain potentiometer.

The following is valid for the 2 VCAs.

- The gain potentiometer allows you to hear the audio outside the envelope level. It will therefore generally be set to 0 except when you want to hear the pitch or make a drone.
- The LFO2 potentiometer allows an amplitude modulation in addition to the gain or the envelope.
 - * A jumper at the back allows you to set this LFO in phase opposition (by default) or not on each VCA (appendix 6)
- The envelope potentiometer sets the opening level of the VCA.
- The MIX potentiometer allows you to send the output of the VCA to outputs 1 (left) or 2 (right) of the synthesizer, to a mixing desk (line level).



- The Pan Button engages the LFO3 whose waveform will be selected on the controller and will execute an automatic panning.



To stop the Pan, it is advisable to press the Pan button on the VCAs first and then stop the LFO3 on the control screen. Otherwise you will not hear anything.



If the Gain and Envelope potentiometers are set to 0, no output. Also do not forget the general volume potentiometer.



The tutorial N°4 shows the MIXER, VCF, VCA and envelope generator functions. [Médias | SynthR](#) or [SynthR4 - Tuto 4 : la façade droite - YouTube](#)

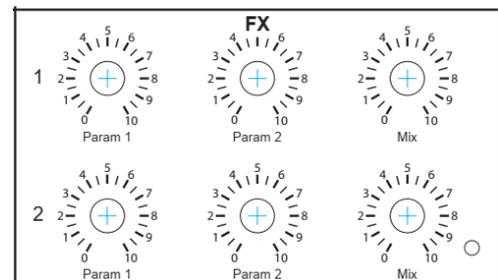
FX

The page of this module will be called from the controller by pressing the FX button.

A long press will turn off the effects. Pressing Back returns to the previous screen but does not turn off the effect.

8 effects with their variants are available independently for each channel.

- Phasing low resonance
- Phasing high resonance
- Chorus low resonance
- Chorus high resonance
- Flanger low resonance
- Flanger high resonance
- Reverb low resonance
- Reverb high resonance
- Shimmer on -1 octave reverb
- Shimmer on +1 octave reverb
- Shimmer on -1 octave echo
- Shimmer on +1 octave echo
- Delay
- Ping Pong Delay or stereo delay.



A Mix setting allows you to dose the Wet / Dry per channel. The dry signal does not pass through the circuit.

The parameter knobs are described on the screen.

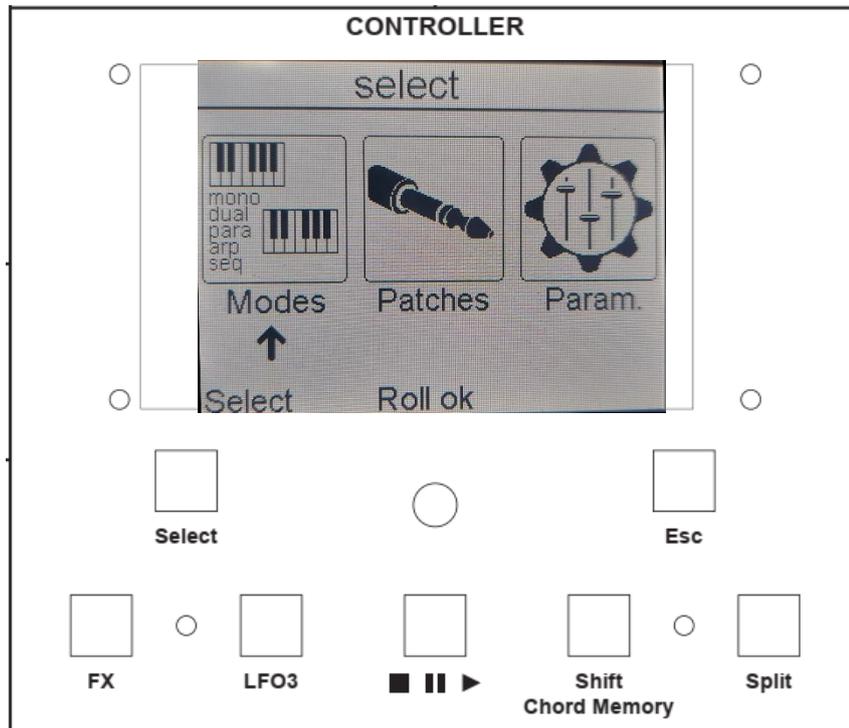
Tip: the more audio sources there are in the mixer when using the FX, the more you need to lower their input level in order not to saturate the effect. A position around 5 on the knobs is often sufficient.



See tutorial #3 for more information.

USE OF THE MIDI CONTROLLER

Now that you are familiar with the SYNTHR4, its analog part, its possibilities, we will go into the details of the MIDI controller and its different MENUS.



The MIDI Controller is interfaced around a graphic display, seven illuminated push buttons and a rotary encoder.

After switching on the main screen appears as follows with the 3 main menus.

VARIABLE FUNCTION KEYS

The " **Select** " key moves the arrow that indicates the current selection

Pressing the encoder (**Roll OK**) confirms the selection or moves the arrow within a page.

The " **Esc** " key allows you to go back in the menus or to return to the current game mode.

FIXED FUNCTION KEYS

The " **FX** " key allows you to call up the effects page at any time and the Esc key, which becomes **Back**, allows you to exit.

The " **LFO3** " key allows you to call up the LFO page at any time and the Esc key which becomes **Back** allows you to exit.

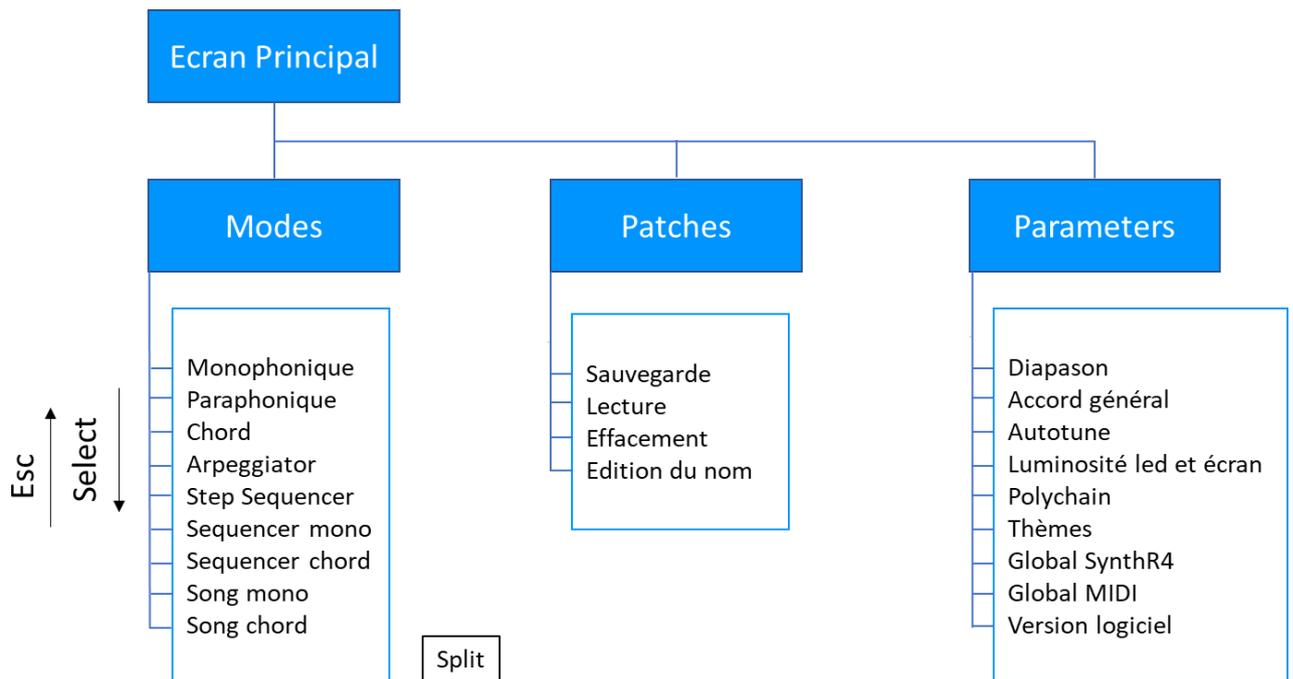
The " **Start, Pause, Stop** " key allows you to manage the activation of the sequencers and the songs.

The " **Shift, Chord Memory** " key allows you to record a chord in CHORD mode, to scroll notes from 1 to 16 (max) on the MIXER LEDs in Step Sequencer mode and to delete notes in Arpeggio mode.

The " **Split** " button allows you to modify the current playing mode by pressing it briefly, in order to split the MIDI keyboard into 2 while remaining on the same channel. The split point is determined by a long press. The LED flashes until a key is pressed on the keyboard..

MENU ORGANIZATION

The screen shows 3 main menus: **Modes**, **Patches** and **Param**.



The tutorial N°5 allows you to familiarize yourself with the use of the controller. [Médias | SynthR](#) ou [SynthR4 - Tuto 5 : Controller - YouTube](#)

THE PLAY MODES

Depending on the play mode, some buttons are forbidden; don't be surprised if you can't use them, it's a normal operation.

The play modes have priority and are always active in the background. In the main menu.

MONOPHONIC MODE

Select Modes then OK, select Monophonic then OK.

This is the play mode allowing almost any combination:

The VCOs and other sources can be sent to one or the other filter or both at the same time. The sounds produced can be sent to one or both line outputs.

In this mode there is only one note possible on the keyboard and therefore only one " Gate " which controls the 3 envelopes. The filter envelope is sent to the 2 VCFs and the VCA envelope to the 2 VCAs. The Modulation envelope is free to use for FM, PWM, LFO2 destinations.

The VCOS can be synchronized, at different octaves or detuned.....

SUB1 follows VCO1 and SUB2, VCO3

SPLITTED MONOPHONIC MODE (DUAL MONO)

By pressing the " Split " key, you can get VCO1 and 2, SUB1 on the left side of the keyboard : channel 1. The VCO3 and 4, the SUB2 on the right part, the channel 2. The RM and the NOISE can be on one or the other channel. We thus obtain a duophonic bitimbral play (Dual Mono Mode) according to the sending on such or such channel.

The keyboard separation is C4 by default. As indicated this can be changed.



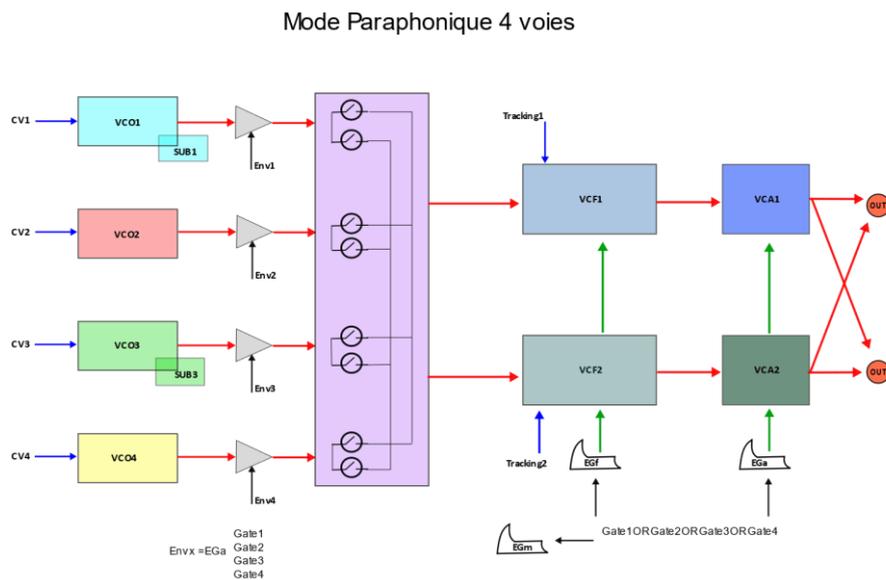
As soon as you SPLIT the keyboard, the modulation envelope becomes the envelope of VCF1, and VCA1, i.e. channel 1. The filter envelope remains the envelope of VCF2 and the VCA envelope remains the envelope of VCA2, which constitutes channel 2.

This applies regardless of the play mode that allows split mode.

PARAPHONIC MODE

This mode allows up to 4 notes to be played simultaneously provided that all 4 VCOs are tuned in unison beforehand. The VCOs can be sent via the MIXER to any channel.

The ADSR settings of the VCA envelope will carry over to the envelope of each note. The other envelopes VCF and Modulation keep their role. It is possible to act on the initial gain of the VCA as well as on the envelope level. The latter is a combination of the individual envelopes of each note.



CHORD MODE

This mode, imitated from the KORG Mono/Poly, allows you to play a 4-note chord with the same remark as for the Paraphonic Mode, that the VCOs are in unison and adjusted in the Mixer.

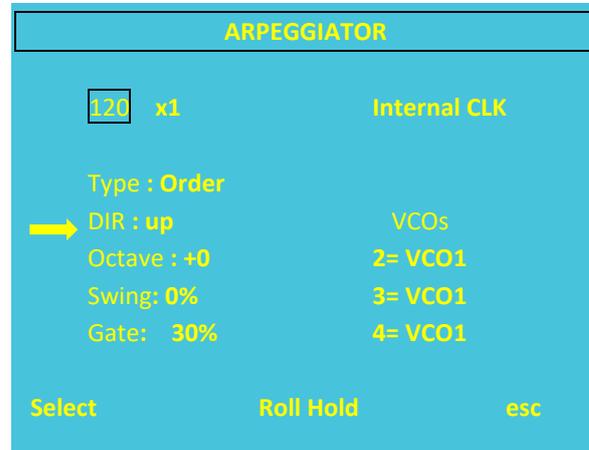
Pressing the "Chord Memory" key puts the keyboard in standby. You press notes from the keyboard in any order and when the last note is released the chord is recorded.

The 4 VCOs are sent by default on channel 1. This can be modified by sending on channel 2 or a mix of the two channels.

CHORD SPLITTED MODE (CHORD 3)

By pressing the "Split" key, we lose the 4th note of the chord to free the VCO4 on the right side of the keyboard. You end up with a left-hand chord on a note in channel 1 and a right-hand note in channel 2.

ARPEGGIATOR MODE



The arrow is moved by the "Select" key. The arrow indicates the parameter to be adjusted by the central encoder.

Pressing the encoder keeps the arpeggio engaged on the keyboard (HOLD mode). The same action can be performed by a sustain pedal connected to the keyboard.

All parameters can be modified in real time and saved except the LFO2 clock and MIDI. The clock is by default set to Internal.

PARAMETERS :

- **Clock** : in BPM modifiable by the encoder from 30 to 300 BPM, followed by a division or multiplication coefficient : /8, /4, /3, /2, x1, x2, x3, x4, x8.
 - **Internal** or **LFO2** or **MIDI** clock. For these last 2 cases the modification of the clock frequency is done on the LFO2 or the MIDI transmitter.
- **Type** : As played (as played on the keyboard), Order (sorted from lowest to highest), followed by many modes to test. There are 11 types in total.
- **Direction**: up, down, up & down, random and brownian (limited random advancement around the pitch)
- **Octave** : 0 one octave, +1 to +4 or 5 octaves.
- **Swing** : from +or - x%.
- **Gate** : + or - y% (gate length)
- **VCOs** : Each VCO can play like VCO1, example **2=VCO1**. But it can also play " **Reverse** ", with a delay of 2 or 3 or 4 notes, ex : **3=1 Note/2**, . a delay of 2 or 3 or 4 notes, ex : **4=Delay 3**.



At any time, a long press on the "Select" button displays the current BPM which can be modified by the encoder.

As long as a note is held, the arpeggio plays and can be modified.

In this mode the audio sources can be sent to channel 1 or channel.



Un appui sur **SHIFT** permet de supprimer ou activer les notes de l'arpège en cours à concurrence de 16.

ARPEGGIATOR SPLITTED MODE

By pressing the "Split" key, VCO3 and VCO4 are released for use on the right side of the keyboard. You end up with a left hand arpeggio and a right hand **duophonic** game. Be careful to tune these 2 VCOs in unison.

Reminder: in this mode it is the Modulation envelope that drives channel 1 and the VCF and VCA envelopes that drive channel 2.



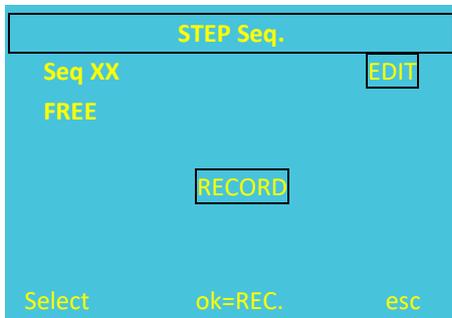
When you like an arpeggio, press the key  : and you will find this arpeggio recorded in the Mono sequencer location 65 under the name " Copy ARP " up to 64 notes. Concerning the VCO2, 3, 4, if the parameters of the arpeggio do not exist in sequence mode the parameter will become = VCO1.

STEP SEQUENCER MODE

Sequence limited to 16 notes.



In order to allow a more varied play in this mode the VCF and VCA envelope for channel 1 becomes the Modulation envelope as in the split modes. In order to have channel 1 and channel 2 with different timbres.



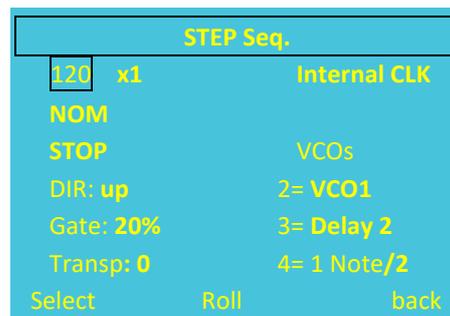
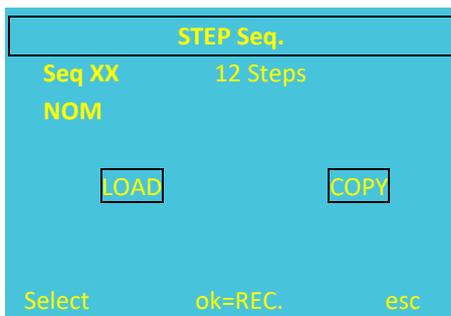
This is how the Sequencer Step screen looks before recording and then during recording. The note is displayed while playing the keyboard, then the next step is waiting.



Above VCF a small bar graph shows the CutOff value of the filter between 0 and 100 which will be recorded with the note. This allows the playback to make CutOff variations that will be sent via the Kbd Tracking potentiometer under the CutOff. To try...

Tip: Give a name to your sequences using the EDIT function which will allow you to edit the term FREE into a NAME using the keyboard that appears. The encoder allows you to move around the keyboard and the select key is enough to choose a letter and save.

Once saved, the screen becomes the following and finally the play screen:



Press this key to start the sequence LED steady, pause -short press- LED flashing or -stop -long press- LED off.

All parameters are modifiable in real time.

PARAMÈTERS :

- **Clock** : in BPM modifiable by the encoder from 30 to 300 BPM, followed by a division or multiplication coefficient : /8, /4, /3, /2, x1, x2, x3, x4, x8.
- **Internal** or **LFO2** or **MIDI** clock. For the last 2 cases the modification is done on the LFO2 or the MIDI transmitter.
- **Direction** : up, down, up & down, random and brownian (limited random advance around the step)
- **Gate** : + or - x% (gate length)
- **Transp**: indicates the number of semitones transposed on the keyboard compared to the recording.
- **VCOs** : Each VCO can play like VCO1, example **2=VCO1**. But it can also play " Reverse ", at the minor third Th-min, at the major third Th-maj, at the fourth Forth, at the fifth Fifth, at the octave Octave, ... with a delay of 2 or 3 or 4 notes, e.g. :**Delay 3**.



Parameters are saved in real time when they are modified. When you reload the sequence, they will automatically be restored in the same way as the notes. If you do not wish to systematically reload the last parameters, you can set in Parameters, global conf : " Load old Seq's param " to NO.

In this mode the audio sources can be sent to channel 1 or channel 2.



While the sequence is playing, it is possible by pressing this button:  to make the "sequence interactive" in the manner of "old school" sequencers such as the Moog 960. The notes scroll on the buttons of the MIXER, different actions are then possible:



- A long press on a key stops the sequence on that note. A long press on the key of the last note of the sequence restores the original sequence.
- A short press on a key skips this note. A new short press restores this note.
- Two or three or four successive presses on a key, allows to put on this note a Ratchet of 2, 3, 4 notes. A press on this key restores the note.

STEP SEQUENCER SPLITTED MODE

By pressing the "Split" key, you release VCO3 and 4 which are directed to channel 2 to be used on the right side of the keyboard. We end up with a left hand sequence and a **monophonic** game with 2 VCOs in the right hand.

SEQUENCER MONO MODE

Sequencer limited to 64 notes and 64 sequences.



In order to allow a more varied play in this mode the VCF and VCA envelope for channel 1 is the Modulation envelope as in the split modes. This allows you to have channel 1 and channel 2 with different timbres.

The screen pages are presented in the same way as the Step Sequencer but do not allow you to record filter variations. Instead, you can decide at the time of recording to put an accent on a particular note of channel 2.



At playback, turn ON the VCF and/or VCA velocity buttons. In this case channel 2 using these envelopes will be played with a velocity of 50% (MIDI value 64) and the accent will be played with a velocity of 100% (MIDI value 127).

Before saving the page shows the following parameters:

- **Step** : number of steps recorded.
- **Duration** : ¼ rest, ratchet*4, ratchet*3, ratchet*2, 1/16 sixteenth, 1/8 eighth note, ¼ quarter, ½ half note, whole.

So each step can take as a time value from the break to the whole through the quarter by default without forgetting the Ratchets.

- **Accent** : Yes,No. See above.

After registration the screen looks like this:



The possible actions are :

"LOAD" and you will find the same screen as the Step sequencer with its parameters.

"COPY" which allows you to copy the sequence to another location.

"Delete " which allows you to erase the sequence.

"Mod/Save" which allows you to modify the notes inside the sequence, to lengthen the sequence, to rename the sequence.

During the execution of the sequence after pressing " Play " it is possible to modify in real time the parameters of Gate, VCOs... these modifications will be kept in the sequence for the next loading.

SEQUENCER MONO SPLITTED MODE

By pressing the "Split" key, you release VCO3 and 4 which are directed to channel 2 to be used on the right side of the keyboard. We end up with a left hand sequence and a **monophonic** game with 2 VCOs in the right hand.

SEQUENCER CHORD MODE

Sequencer limited to 64 chords and 64 sequences

The screen pages are again presented in the same way but the VCOs are blocked in their role.
The step can contain 1 or 2 or 3 or 4 notes.

SEQUENCER CHORD SPLITTED MODE

Pressing the "Split" key releases the VCO4 which is directed to channel 2 for use on the right side of the keyboard. We end up with a 3-note chord sequence for the left hand and a **monophonic** play with 1 VCO for the right hand.

MODE SONG MONO

This is a chaining mode for up to 8 Mono sequences.

This mode allows you to record, playback or delete up to 32 SONG MONO.

The page is presented with 8 empty boxes in which you can select a Mono sequence number with the encoder. Then you move with the " Select " key from box to box to finally go to the action to be performed: **SAVE, RUN, ERASE** or **INSERT**. Indeed, it is possible to insert a sequence between 2 others. To do this, use the Select key to go to the bottom of the action line and choose Insert, then always use the Select key to go back up to the desired sequence and press OK. An empty cell will be inserted in front of it in which you will put the desired sequence..

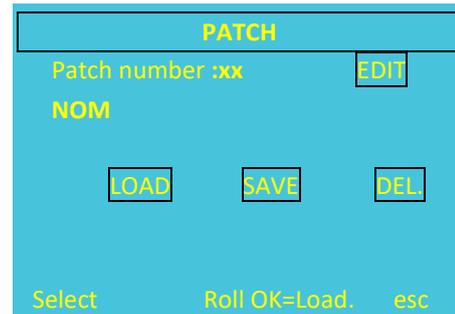
SONG CHORD MODE

This is a chaining mode for up to 8 CHORD sequences. The page is identical to the previous one. This mode allows you to play, record or delete up to 32 SONG CHORD.

PATCHES

The SYNTHR4 is a pre-wired modular synthesizer. That is to say that all the modules which compose it are internally linked by links activated by the memorable front panel buttons. It is thus possible to save, erase, copy and name a profile of buttons activated in a Patch.

A first screen allows you to save the patch. A second screen allows you to load it, delete it.



Tip: Give a name to your profiles using the EDIT function which will allow you to edit the term FREE into a NAME using the keyboard that appears. The encoder allows you to move around the keyboard and the select key is enough to choose a letter and save.



ASSOCIATION OF A PATCH AND A SEQUENCE.

The content of a sequence: notes, note duration, length, screen parameters, is saved in the sequencer mode

In sequencer mode, you can modify your button profile, press "Esc" to go to the Patch menu, and save it. The patch will keep in memory the associated sequence. When you reload this patch after the OK, the game mode will be on the sequencer with the right sequence.

Note that when the synthesizer is started, the last used configuration is reloaded.

Example of copying a patch containing a sequence:

Load the preset, load the associated sequence do ESC, copy to a free location. This copies the sequence. Go to PATCHES, take a free location and press OK.

In a creation principle, it is more natural to start a sequence, save it to a location, modify it, resave it, etc.. In parallel, work on the sound, save it in a specific patch. If you want to associate sound and sequence, load the patch, load the sequence and save the patch again, they will be associated.

PARAMETERS

DIAPASON

This page allows you to activate the internal tuning fork set to 440Hz and to fine tune your VCOs.

GLOBAL TUNING

This page allows you to roughly or finely adjust by + or - an octave, the general tuning outside an A at 440Hz.

AUTOTUNE

This function allows you to update an analog VCO frequency correction table to improve accuracy by running a calibration. **Autotune** should be activated after the synthesizer has warmed up for at least 15 minutes. If you have to change the environment with different temperatures, you may have to restart the calibration. This calibration takes a few minutes. If you are in a hurry, choose the "faster" mode with the Select key. The indicators on the screen turn green and the display returns to the game modes.

BRIGHTNESS

This page allows you to adjust either the brightness of the LEDs on the front panel buttons, or the graphic screen.

POLYCHAIN

Activation of the Polychain mode. This mode allows, depending on the modes used, to recover the additional notes to 4 for example to send them to a SYNTHR3 or a SYNTHR4 or an Expander. The latter must be on MIDI channel **n+1** with respect to the master synthesizer.

INFORMATION ABOUT THE DIN MIDI-OUT SOCKET

	Poychain non activé	Polychain activé
Mode MONO/DUAL	*** Played notes - copy	Nothing
Mode PARA	*** Played notes copy	*** Played notes after the 4th
Mode CHORD et CHORD + Split	*** Chord and note copy	*** played notes after the 4 th
Mode Arpège + Split	*** copy	*** played notes after the 4 th.
Mode Séquenceurs Chord +Split	*** copy	*** played notes after the 4 th.
Mode Séquenceurs Mono et Step + Split	*** copy	*** played notes after the 4 th.

*** : Note_ON, Note_OFF, Aftertouch, Sustain, Molette, Pitch modulation,

This socket is located at the back.

THEME

This page allows you to choose the theme of the graphic screen according to your taste.

GLOBAL SYNTHR4

Settings for this page:

- **Range of Tune 1** : 2, 4, 5, 7, 12 semitones ; fine potentiometer adjustment range of VCO1
- **Range of Tune 2, 3, 4** : 2, 4, 5, 7, 12 semitones ; range of fine potentiometer adjustment of VCO2, 3 ; 4.
- **Range of Pitch wheel** : 1, 2, 4, 5, 7, 12 semitones ; adjustment range of the pitch wheel action.

- **Load old seq parameter** : Yes No ; allows to activate or not the saving of the parameters of the sequence.
- **Restore Factory Settings** : Yes, No.
 - A YES setting will cause the equivalent of a "PANIC" (see below) plus the following actions:
 - The 1st graphic theme is selected (white on blue background)
 - The split note is MIDI note 48 (C4)
 - The clock source is set to Internal
 - The global settings are for Tune 1,234, set to 7, pitch wheel to 2
 - MIDI Channel = 0, MIDI OUT = Off, MIDIClock Out = Off
 - Pitch OFF
 - Polychain OFF
 - Arpeggiator and sequencer parameters are reset.

GLOBAL CONF MIDI

Settings for this page:

- **MIDI Channel IN** :0 (auto) or 1 to 16
When the value is set to zero, the system will move to the midi channel detected by the first incoming midi action, then stay there.
- **MIDI Channel OUT** : 0 (Off) or 1 to 16
When the value is set to zero, no MIDI information will be broadcast via the MIDI DIN OUT or MIDI USB OUT.
- **MIDI clock out** : On Off
The value should be set to ON to drive an external expander and will correspond to the SYNCHRO 24 of the displayed BPM.

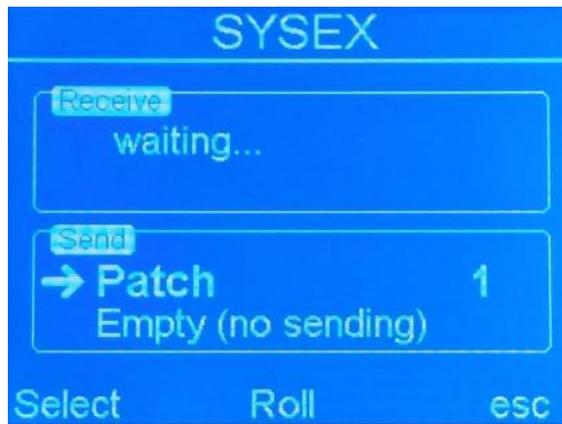
SYSEX

The SynthR4 is able to send and receive SysEx(*) files. This function is accessible from the "Settings" menu. The Sysex files of the SynthR4 are used to save and restore each Patch or Sequence

Communication between the SynthR4 and the computer is ensured through a USB cable connected between the " MIDI_USB " socket of the SynthR4 and a USB connector of your computer system.

A communication software will be necessary: MIDI-OX (Windows) or SendSX (V4.0 or higher) (Windows) or Snoize (Mac) are utilities that manage sysex. All of them are freeware.

The sending or receiving will be done only from the "SYSEX" page of the synthR4. It is not allowed to load sysex files 'on the fly'



SynthR4 Page sysex

In practice, create all the Patches and Sequences you want, then save the ones you want to keep via the send function. You can then delete or modify the Patches or Sequences on the SynthR4 knowing that you can return to the situation saved in the sysex file.

You are free to organize the file names and directories on your computer system.

SEND :

Using the select button, you can move the selector (right arrow) between the choice of the type of file to be sent (Patch, Step Seq., Seq.mono, Seq.chord) and the patch/sequencer number to be sent. The choices are modified by the encoder.

Once this choice has been made, press OK, a virtual LED will appear to indicate that the sending is effective.

Please note that in most of the software you have to activate the "Detect bulk dumps" option when sending or receiving large files (as in the case of Chord Sequencer files).

RÉCEIVE :

There is nothing to do. The SynthR4 is passive and waits to receive files that conform to its format (see appendix).

When a file is received, it is immediately saved to its original location. (For example PATCH number 12).

ABOUT

Shows you the current software versions and the time of use. The Credits button gives you the participants in this project.



In all pages of the Settings menu, the ESC key takes you directly back to the previous game mode. To return to the Settings page, press Esc twice and then Select twice

To use the Panic mode, simply press the encoder button for 5 seconds

It allows to find:

- A brightness of 60% for the screen.
- 50% brightness for the push buttons.
- The activation of the automatic search for the MIDI channel.
- The loading of a standard INIT patch:
 - MONO mode.
 - VCO1 and VCO3 on filter 1 waveform activated sine.
 - Sub1 and Sub2 triangle activated.
 - VCF on LP.
- VCO1 and 3 are sent to VCF1.
- By default the internal clock will be on 120 BPM.
- Sending of : All Note OFF MIDI
- Sequencers are turned off.
- Effects are turned off.

APPENDIX 1 : MIDI KEYBOARD

To take advantage of the SYNTHR4's features, the keyboard must have pitch bend, modulation wheel, aftertouch and velocity, as well as a sustain pedal, and be equipped with a 5-pin DIN connector. A keyboard equipped with only one USB plug can be used via the USB Host plug located at the back.

Type	Message	Description
Channel Voice Message	NOTE_ON	Start of a note with its velocity
	NOTE_OFF	End of a note
	AFTERTOUCH	Pressure variation on the whole keyboard
	PITCH BEND	
Control Change message	MOD WHEEL	Modulation wheel
	SUSTAIN	Sustain pedal (On-Off)
System Real Time Message	CLOCK	Timing Clock
	START	Start sequence
	STOP	Stop sequence
	Continue	Continue the sequence at the breakpoint

The keyboard is responsible for the velocity and aftertouch curves. The SynthR4 only retrieves the information.

APPENDIX 2 : HOW TO CHANGE FILTER

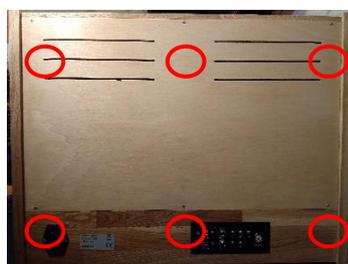
Filters available as standard or as an option.

VCF LP		equivalence	VCF Multi		equivalence
ARP 4072	24dB	Arp2600	SEM	12dB *	Oberheim SEM
MOOG	24dB	Moog	STEINER	12dB	Steiner Parker
AS3320	24dB	PRO-One	SVF 3320	12dB *	
SSI2144	24dB	Polysix	SYNTHEX	LP 24 dB HP, BP 12dB	Elka Synthex
ARP 4012	24dB	Moog like	JP6	LP, HP 24dB, BP 12dB	Roland JP6
JP8	12 or 24dB	Roland JP8			

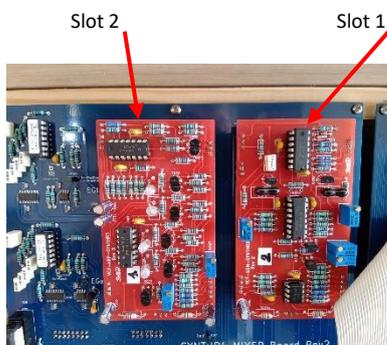
*The 3 modes can be mixed in the state variable filters for the others even if it is allowed it is not recommended.

** More filters may appear.

Switch off the synthesizer. Then remove the 6 screws from the rear panel.



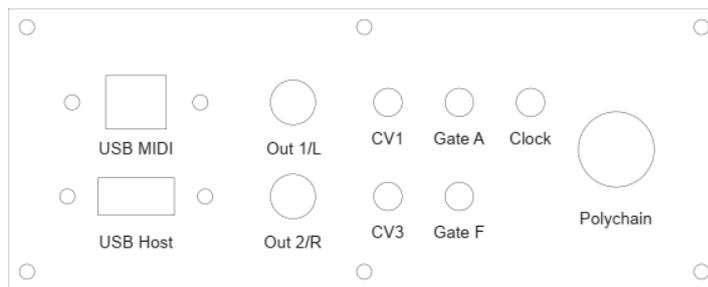
Carefully remove filter 1 or filter 2 by taking it by the 4 corners and pull alternately right and left with small movements.



To replace another filter, align the connectors, if possible starting with the connector at the bottom of the card, then align all the contact points and push in the circuit, the cards must be aligned with the underlying silk-screen printing, then close the rear panel if necessary.

APPENDIX 3 : REAR FACE

The rear panel shows the connections to the outside world:



- OUT1/L and OUT2/R for audio connection to a mixer or line level amp. 1 and 2 correspond to the channels.
- CV1 and CV3 which correspond to the control voltages of VCO1 and VCO3 which can be used to control, for example, a modular device with a standard 1 Volt per octave.
- Gate A and Gate F which, depending on the mode, are either identical or distinct. The SynthR4 can thus sequence a modular.
- Clock: TTL compatible clock available in arpeggiator or sequencer mode, representing either the internal clock multiplied by the coefficient of the MIDI controller, or the MIDI clock imposed on the SYNTHR4.
- The " Polychain " DIN socket (see above).

APPENDIX 4 : EXTERIOR MAINTENANCE

The wood of the SYNTHR4 is not varnished but waxed, which means that it is always possible to clean and re-wax it if the need arises. The color of the board is light oak.

The front of the SYNTHR4 is made of aluminum and the inscriptions are made by a process that avoids any relief and resists standard cleaners. To remove fingerprints or glue, I recommend the F essence available in supermarkets or household alcohol.

APPENDIX 5 : HARDWARE OPTION

Modification of the INV envelope direction of the filter :



Modification of the LFO2 phase on the VCAs.



1.71.85

Introduction in the parameters page of the exchanges in SYSEX which allow to save and reload Patch, Sequences. See usage.

Improvements of some features.

- improvement of the management of the octave selection buttons after loading a patch..
- The shift mixer is now automatically deactivated when a new playing mode is selected.
- In Step Sequencer mode, the modification of the sequence length in LIVE is only possible within the interval of the notes you have previously recorded (for example, between 1 and 12 steps if your sequence is 12 steps long). Changing the length in the usual way is still possible.
- The management of MIDI IN and OUT channels is improved. When the synthesizer starts, the channel will remain on the channel you have chosen in the "GLOBAL MIDI" menu. If your choice is to set the IN channel to automatic, the channel will be detected at each startup.

1.72.87

The evolution of the 1.71.85 software to the 1.72.87 software allows to increase the reliability of the selection of the sequencer included in a saved patch as well as a better integration of the selection of the BP, LP, HP switches according to the filters.

1.74.87

Change in the management of the arpeggiator and sequencers:

From now on the encoder allows the parameter to be selected either upwards or downwards. Pressing the encoder again changes the value of this parameter and finally pressing it again returns to the selection of the parameter.

For the arpeggiator: a short press on " Select " becomes HOLD. A long press returns the clock in BPM.

For sequencers: a short press on " Select " allows the LFO2 or MIDI clocks to resynchronize. A long press returns the clock in BPM.

NOTE REGARDING FILTERS

State variable filters: SVF like the SEM or MM3320 can mix modes which the buttons allow.

For all other multimode filters, even if mixing is allowed by construction on the first models, it is strongly discouraged. For example, on a JP6 type filter, do not press LP and BP at the same time.

Reminder: All Low Pass filters allow only the LP button.

PATCHES BOOK

There are 4 presets associated with 4 demonstration sequences, 2presets associated to an arpeggio and 9 various presets.

These patches are just a start to orient you to some sounds. Some of them require Modulation Wheel or Aftertouch to trigger the LFO2.

If a switch is lighted, the associated potentiometer play according your taste.

All the patches here were made with the **SEM filter in VCF1** and the **LP 2144 (Polysix) filter in VCF2**.

The uninformed potentiometers are generally at 0 but nothing prevents you from activating a link and playing with.

Patches

Sequences

Number	Mode	Name
65	Mono	Patch Init
66	Step Seq	TDREAM 960
67	Step Seq	CHEROKREE
68	Seq Mono	VANGALIS
69	Seq Chord	COMPLEX
70	Arpeggiator *	ONE FINGER
71	Mono **	SWEEP BASS
72	Mono ***	AFTER LEAD1
73	Mono	AFTER LEAD2
74	Dual Mono	BASS / LEAD
75	Arp + split ****	GROOVE SPLIT
76	Mono *****	ZAWINUL BASS
77	Mono	SALKACHAO
78	Paraphonic	S4 STRINGS
79	Paraphonic	CS BRASS
80	Paraphonic	POLY4 STEREO

Number	Mode	Name
65	Mono	Copy ARP (user)
65	Step Seq	TDREAM 960
66	Step Seq	CHEROKREE
66	Seq Mono	VANGALIS SEQ
65	Seq chord	COMPLEX SEQ

* Arpeggio parameters : 200x2, type 1.5.2.4.3, Brwn, +1, 0%, 10%, 2=1note/2, 3=Delay2, 4=reverse

** VCO1 : Octave-2

*** Usage aftertouch

**** Press « Split » 1 note main gauche, Arpeggio parameters. : 120x1, as played, up, 0, 0%, 30%, 2=VCO1

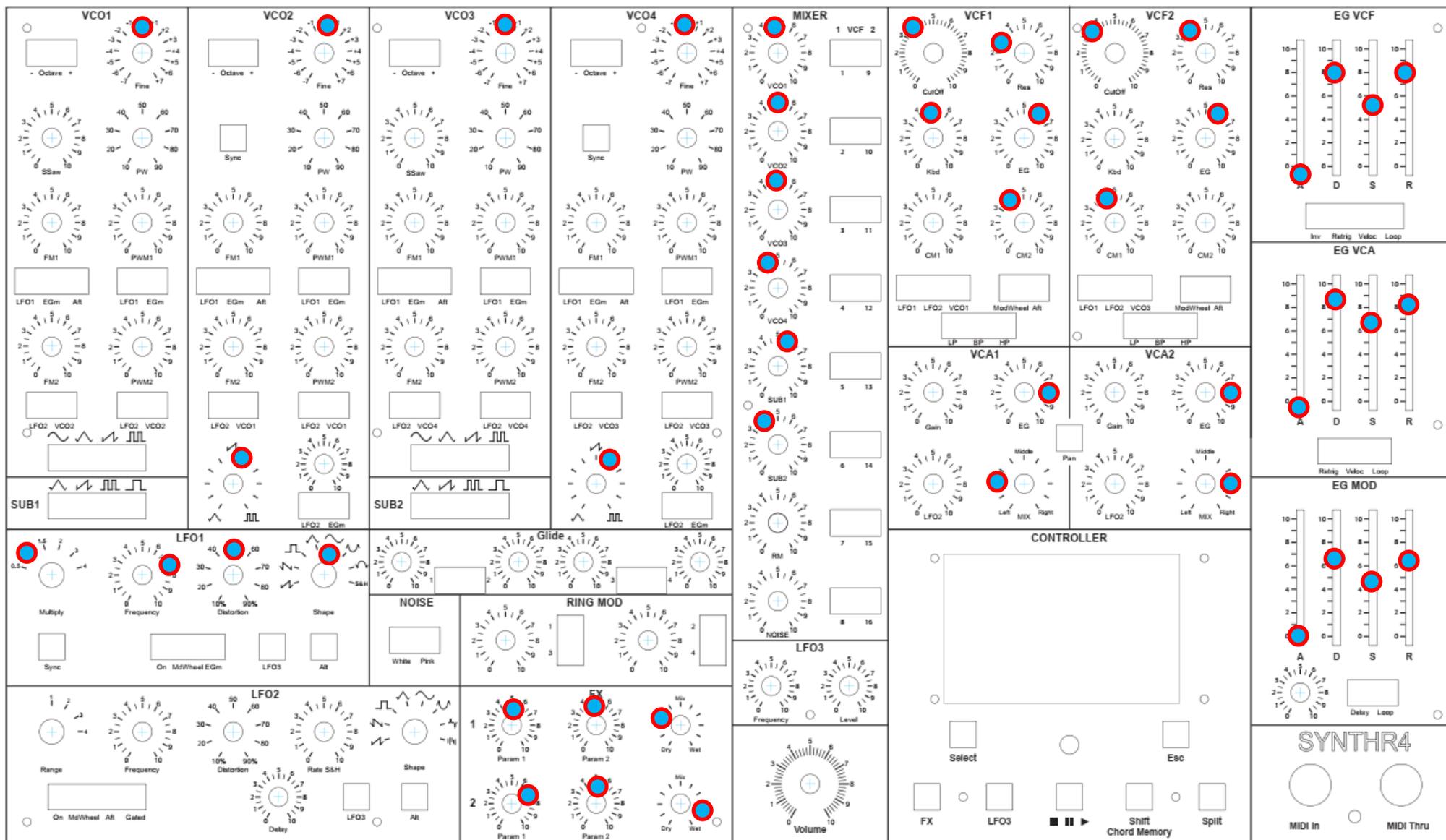
***** VCO3 : Octave-2

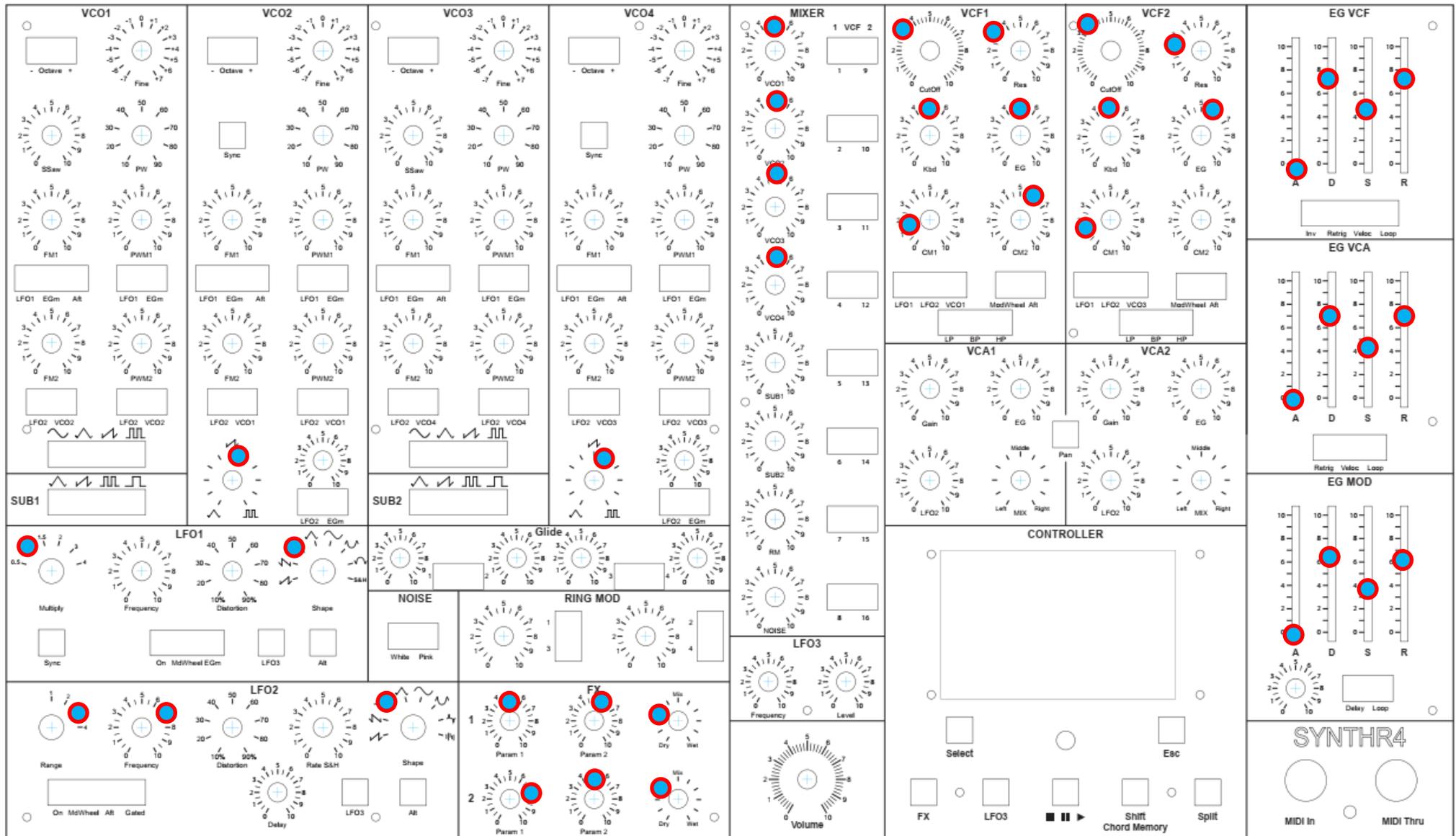
Reminder : 64 user patches +15 demo, 64 sequences mono + 1 demo, 64 step sequenceurs + 2 demos,

Reminderl : The patch load the play mode associated.

The image displays a comprehensive patch editor for a synthesizer, organized into several functional sections:

- VCOs (VCO1-VCO4):** Each VCO module includes controls for Octave, Fine tuning, Waveform selection (Saw, PW, FM1, PWM1, FM2, PWM2), and LFO modulation (LFO1 EGm, Alt, LFO2 VCO1, VCO2, VCO3, VCO4).
- MIXER:** Features a 4-bus mixer with VCO1-VCO4 inputs, a volume knob, and a 'VCF 2' input.
- VCFs (VCF1-VCF2):** Each VCF module has a Cutoff knob, a Resonance knob, and filter type selection (LP, BP, HP).
- EGs (EG VCF, EG VCA, EG MOD):** Envelope generators for VCF, VCA, and modulation, with parameters for Attack (A), Decay (D), Sustain (S), and Release (R).
- LFOs (LFO1-LFO3):** LFO1 includes Multiply, Frequency, Distortion, and Shape controls. LFO2 includes Range, Frequency, Distortion, and S&H. LFO3 includes Frequency and Level.
- FX (Effects):** Includes Noise, Ring Mod, and FX modules with various parameters like White/Pink noise, Param 1/2, Dry/Wet, and Delay.
- CONTROLLER:** A large central area for MIDI controller mapping, including buttons for Select, Esc, FX, LFO3, Shift Chord Memory, and Split.
- SYNTHR4:** MIDI In and MIDI Thru ports.





The control panel is organized into several functional sections:

- VCO1-4:** Four Voice Cores, each with Octave, Fine, SSaw, PW, FM1, PWM1, FM2, and PWM2 controls.
- MIXER:** Controls for VCO1-4, SUB1, SUB2, and LFO3, including level meters and routing options.
- VCF1-2:** Two Voltage Control Filters with CutOff, Res, Kbd, and CM1/2 controls.
- EG VCF:** Envelope Generator for VCFs with Invert, Retrigger, Velocity, and Loop options.
- EG VCA:** Envelope Generator for VCAs with Retrigger, Velocity, and Loop options.
- VCA1-2:** Voltage Control Amplifiers with Gain, EG, and ModWheel controls.
- EG MOD:** Envelope Generator for Modulation with Retrigger, Velocity, and Loop options.
- LFO1-3:** Low Frequency Oscillators with various waveforms and modulation parameters.
- NOISE:** Noise generator with White and Pink noise options.
- RING MOD:** Ring Modulation section with frequency and level controls.
- FX:** Effects section with Param 1/2, Dry/Wet, and Delay controls.
- CONTROLLER:** A large central area for MIDI and performance control, including Select, Esc, FX, LFO3, Shift Chord Memory, and Split buttons.
- SYNTHR4:** MIDI In and MIDI Thru ports.

Réglages autres identiques au patch précédent

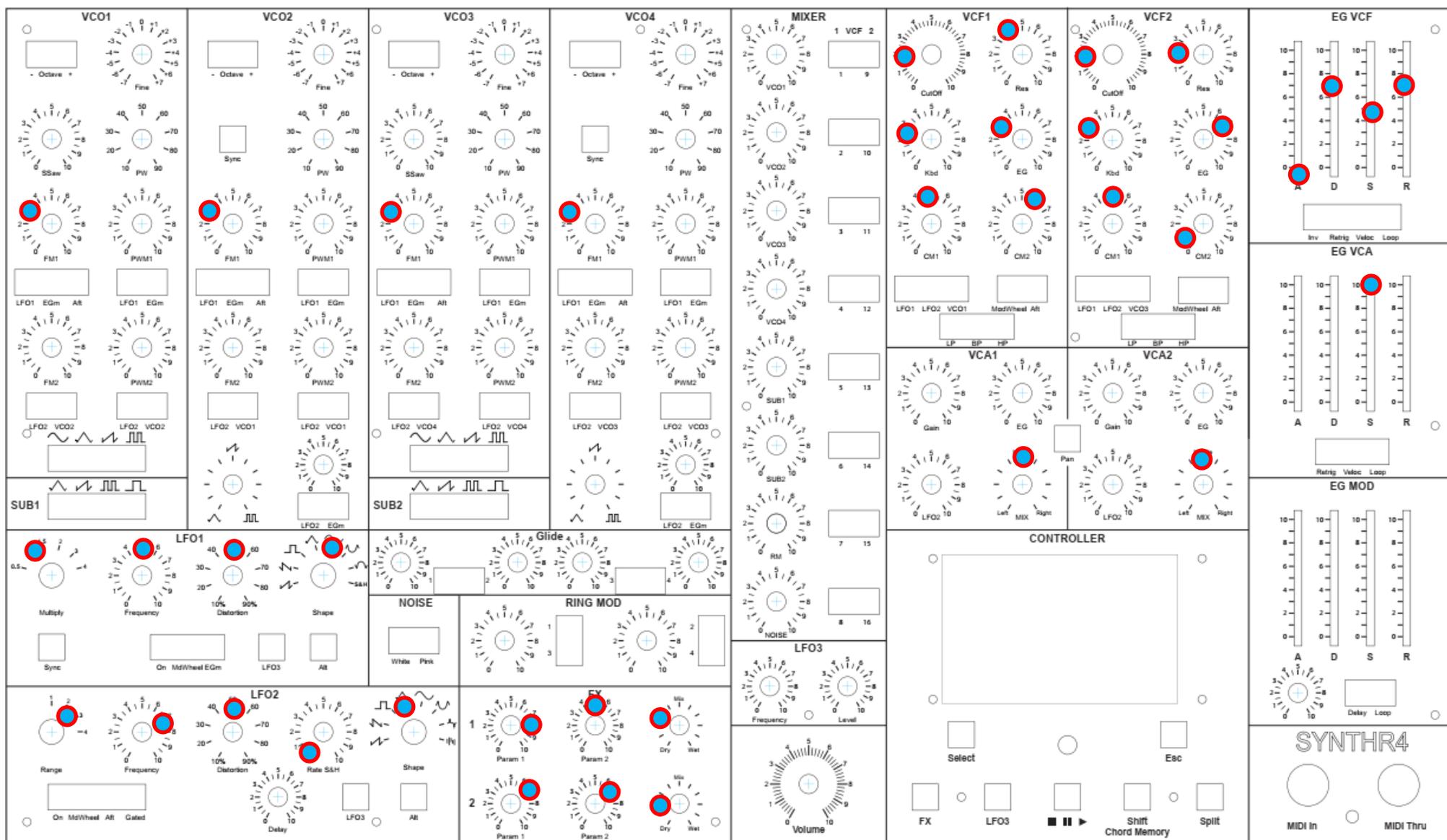
The image displays the SYNTHR4 synthesizer interface, organized into several functional sections:

- VCO1-4:** Four Voltage Controlled Oscillators, each with Octave, Fine, SSaw, PW, FM1, and PWM1 controls.
- MIXER:** A central section for routing VCOs (1-4) and SUB1-2 into VCF1 and VCF2.
- VCF1-2:** Two Voltage Controlled Filters with CutOff, Res, Kbd, and EG controls.
- EG VCF:** Envelope Generator for VCFs with parameters for Inv, Retrigger, Velocity, and Loop.
- EG VCA:** Envelope Generator for VCA with parameters for Retrigger, Velocity, and Loop.
- VCA1-2:** Voltage Controlled Amplifiers with Gain, EG, and ModWheel controls.
- EG MOD:** Envelope Generator for Modulation with parameters for Retrigger, Velocity, and Loop.
- LFO1-3:** Low Frequency Oscillators with various waveforms and modulation parameters like Multiply, Frequency, Distortion, and Shape.
- NOISE & RING MOD:** Noise generator and Ring Modulation section.
- CONTROLLER:** A large section for performance control including Select, Esc, FX, LFO3, Volume, Shift Chord Memory, and Split.
- SYNTHR4:** MIDI In and MIDI Thru ports.

Red circles highlight specific knobs and buttons, such as the Octave knob on VCO1, the VCO1-4 mixer buttons, the CutOff knob on VCF1, the Gain knob on VCA1, and the Volume knob in the Controller section.

The image displays the SYNTHR4 synthesizer interface, which is divided into several functional sections:

- VCO1-4:** Four Voltage-Controlled Oscillators, each with Octave, Fine, SSaw, PW, FM1, and PWM1 controls.
- MIXER:** A central section for mixing the four VCOs, with individual level knobs for VCO1-4 and a volume knob.
- VCF1-2:** Two Voltage-Controlled Filters, each with CutOff, Res, Kbd, and EG controls.
- EG VCF:** Envelope Generator for the VCFs, with parameters for Attack (A), Decay (D), Sustain (S), and Release (R).
- VCA1-2:** Voltage-Controlled Amplifiers, with Gain, EG, and ModWheel controls.
- EG MOD:** Envelope Generator for the VCA, with parameters for Attack (A), Decay (D), Sustain (S), and Release (R).
- LFO1-3:** Low-Frequency Oscillators with various waveforms and modulation parameters like Multiply, Frequency, Distortion, and Shape.
- NOISE & RING MOD:** Noise generator and Ring Modulation section.
- FX:** Effects section with parameters for Param 1, Param 2, Dry, and Wet.
- CONTROLLER:** A large section for performance control, including a pitch wheel, buttons for Select, Esc, FX, LFO3, Shift Chord Memory, and Split.
- SYNTHR4:** MIDI interface section with MIDI In and MIDI Thru ports.



Réglages identiques à After Lead1

AFTER LEAD2

The image displays the SYNTHR4 synthesizer interface, organized into several functional sections:

- VCO1-4:** Four Voltage Controlled Oscillators, each with Octave, Fine, SSaw, PW, FM1, and PWM1 controls.
- MIXER:** A central section for routing VCOs (VCO1-VCO4) and SUB1-SUB2 into two VCFs (VCF1, VCF2).
- VCF1-2:** Two Voltage Controlled Filters with CutOff, Res, Kbd, and EG controls.
- EG VCF:** Envelope Generator for the VCFs, with D, S, and R stages.
- EG VCA:** Envelope Generator for the Voltage Controlled Amplifiers, with A, D, S, and R stages.
- VCA1-2:** Voltage Controlled Amplifiers with Gain, EG, and ModWheel controls.
- EG MOD:** Envelope Generator for modulation, with A, D, S, and R stages.
- NOISE:** Noise generator with White and Pink options.
- RING MOD:** Ring Modulation section with Frequency and Level controls.
- LFO3:** Low Frequency Oscillator 3 with Frequency and Level controls.
- FX:** Effects section with Param 1, Param 2, Dry, and Wet controls.
- LFO1-2:** Low Frequency Oscillators 1 and 2 with various modulation parameters like Multiply, Frequency, Distortion, Shape, and Rate S&H.
- CONTROLLER:** A large central area for performance control, including Select, Esc, FX, LFO3, Shift Chord Memory, and Split buttons.
- SYNTHR4:** MIDI In and MIDI Thru ports.

The image displays the GROOVE SPLIT synthesizer interface, organized into several functional sections:

- VCO1-VCO4:** Four Voltage Controlled Oscillator modules, each with parameters for Octave, Fine, SSaw, PW, FM1, FM2, LFO1, LFO2, and VCO2/VCO1/VCO4.
- MIXER:** A central section for mixing the four VCO outputs, with sliders for VCO1-4 and a Volume knob.
- VCF1-VCF2:** Two Voltage Controlled Filter modules, each with parameters for CutOff, Res, Kbd, EG, CM1, and CM2.
- EG VCF & EG VCA:** Envelope Generator sections for the VCF and VCA, with sliders for Attack (A), Decay (D), Sustain (S), and Release (R).
- VCA1-VCA2:** Voltage Controlled Amplifier modules with Gain, EG, and ModWheel/Alt parameters.
- EG MOD:** Envelope Generator for modulation, with sliders for A, D, S, R and a Delay/Loop knob.
- LFO1-LFO3:** Low Frequency Oscillator modules with various waveforms and parameters like Multiply, Frequency, Distortion, Shape, and Rate S&H.
- NOISE & RING MOD:** Noise and Ring Modulation sections with Frequency and Level controls.
- CONTROLLER:** A large section for MIDI controller input, including buttons for Select, FX, LFO3, Shift Chord Memory, and Split.
- FX:** Effects section with parameters for Param 1, Param 2, Dry, and Wet.
- SYNTHR4:** MIDI In and MIDI Thru ports.

The image displays the SYNTHR4 synthesizer interface, organized into several functional sections:

- VCO1-4:** Four Voltage Controlled Oscillators, each with Octave, Fine, SSaw, PW, FM1, and PWM1 controls.
- MIXER:** A central section for routing VCO1-4 and SUB1-2 signals to VCF1 and VCF2.
- VCF1-2:** Two Voltage Controlled Filters with CutOff, Res, Kbd, EG, CM1, and CM2 controls.
- EG VCF:** Envelope Generator for the VCFs, with D, S, and R stages.
- VCA1-2:** Voltage Controlled Amplifiers with Gain, EG, and ModWheel controls.
- EG MOD:** Envelope Generator for the VCA, with D, S, and R stages.
- CONTROLLER:** A large section for performance control, including Select, Esc, FX, LFO3, Volume, Shift Chord Memory, and Split buttons.
- SYNTHR4:** MIDI In and MIDI Thru ports.
- Other Modules:** LFO1-2, NOISE, RING MOD, and FX sections with various modulation and effect controls.

The image displays the SYNTHR4 synthesizer interface, organized into several functional sections:

- VCO1-4:** Four Voltage Controlled Oscillator modules, each with Octave, Fine, and various waveform (SSaw, PW, FM1, PWM1, FM2, PWM2) and LFO (EGm, Alt) controls.
- MIXER:** A central section for routing VCO1-4, SUB1, and SUB2 signals into VCF1 and VCF2.
- VCF1-2:** Two Voltage Controlled Filter modules with CutOff, Res, Kbd, EG, and CM1/CM2 controls.
- EG VCF:** Envelope Generator for the VCFs, with parameters for Inv, Retrigger, Veloc, and Loop.
- EG VCA:** Envelope Generator for the Voltage Controlled Amplifiers, with parameters for Retrigger, Veloc, and Loop.
- VCA1-2:** Voltage Controlled Amplifier modules with Gain, EG, and Pan controls.
- EG MOD:** Envelope Generator for modulation, with parameters for Retrigger, Veloc, and Loop.
- NOISE:** A noise generator with White and Pink noise options.
- RING MOD:** Ring Modulation module with Frequency and Level controls.
- LFO1-3:** Low Frequency Oscillator modules with various waveform and modulation options.
- FX:** Effects processing section with Param 1, Param 2, Dry, and Wet controls.
- CONTROLLER:** A large central area for MIDI and performance control, including Select, Esc, FX, LFO3, Shift Chord Memory, and Split buttons.
- SYNTHR4:** The main synthesizer interface at the bottom right, featuring MIDI In and MIDI Thru ports.

The image displays the SYNTHR4 synthesizer interface, organized into several functional sections:

- VCO1-VCO4:** Four Voice Cores, each with Octave, Fine, SSaw, PW, FM1, PWM1, LFO1 EGm, and Alt controls.
- MIXER:** Mixer section with VCO1-VCO4 level meters and a Volume knob.
- VCF1-VCF2:** Two Voltage Controlled Filters, each with CutOff, Res, Kbd, EG, CM1, and CM2 controls.
- EG VCF, EG VCA, EG MOD:** Envelope Generator section with Attack, Decay, Sustain, and Release sliders.
- LFO1, LFO2, LFO3:** Low Frequency Oscillators with Multiply, Frequency, Distortion, Shape, and Sync parameters.
- NOISE, RING MOD, FX:** Noise, Ring Modulation, and FX sections with various parameters like White/Pink, Ring Mod, Param 1, Param 2, Dry, and Wet.
- CONTROLLER:** A large touchpad and buttons for Select, Esc, FX, LFO3, Shift Chord Memory, and Split.
- SYNTHR4:** MIDI In and MIDI Thru knobs.

The image displays the SYNTHR4 synthesizer interface, organized into several functional sections:

- VCO1-4:** Four Voice Cores, each with Octave, Fine, SSaw, PW, FM1, PWM1, FM2, and PWM2 controls.
- MIXER:** A central section for routing VCO1-4, SUB1, and SUB2 signals to VCF1 and VCF2.
- VCF1-2:** Two Voltage Control Filters with CutOff, Res, Kbd, EG, and CM1/2 controls.
- EG VCF:** Envelope Generator for VCFs with Invert, Retrigger, Velocity, and Loop options.
- VCA1-2:** Voltage Control Amplifiers with Gain, EG, and ModWheel/Alt controls.
- EG MOD:** Envelope Generator for Modulation with Retrigger, Velocity, and Loop options.
- CONTROLLER:** A large section for performance control, including Select, Esc, FX, LFO3, Volume, Shift/Chord Memory, and Split buttons.
- Other Modules:** LFO1-3, NOISE, RING MOD, and FX sections with various modulation and effect parameters.

Red circles highlight several parameters across the interface, including:

- Octave and Fine knobs in VCO1-4.
- SSaw, PW, FM1, and PWM1 knobs in VCO1-4.
- Gain knobs in VCA1 and VCA2.
- EG and ModWheel/Alt knobs in VCA1 and VCA2.
- Gain knobs in EG VCF and EG MOD.
- Volume knob in the CONTROLLER section.
- FX, LFO3, and Shift/Chord Memory buttons in the CONTROLLER section.

