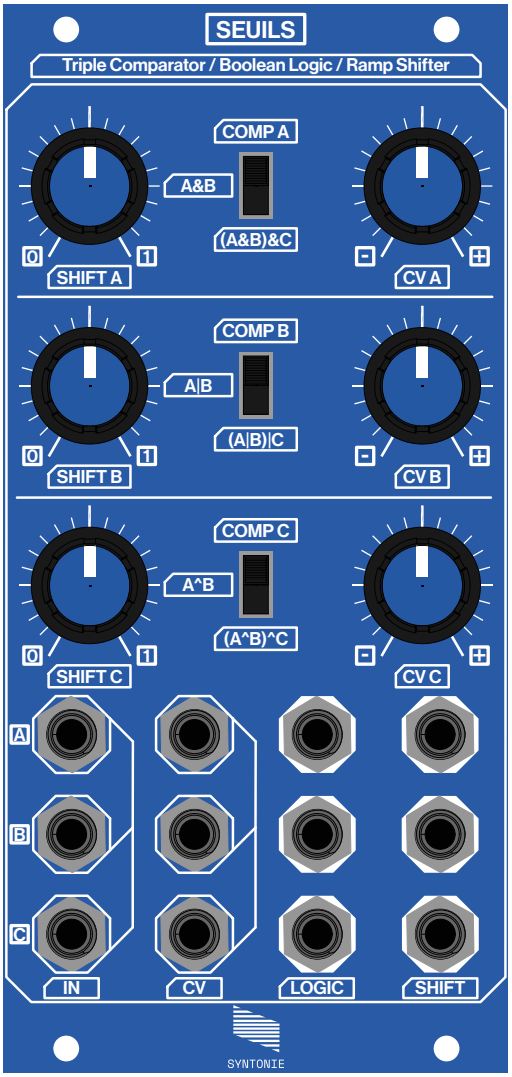
Seuils

Triple Comparator / Boolean Logic / Ramp Shifter¬

User documentation

SYNTONIE

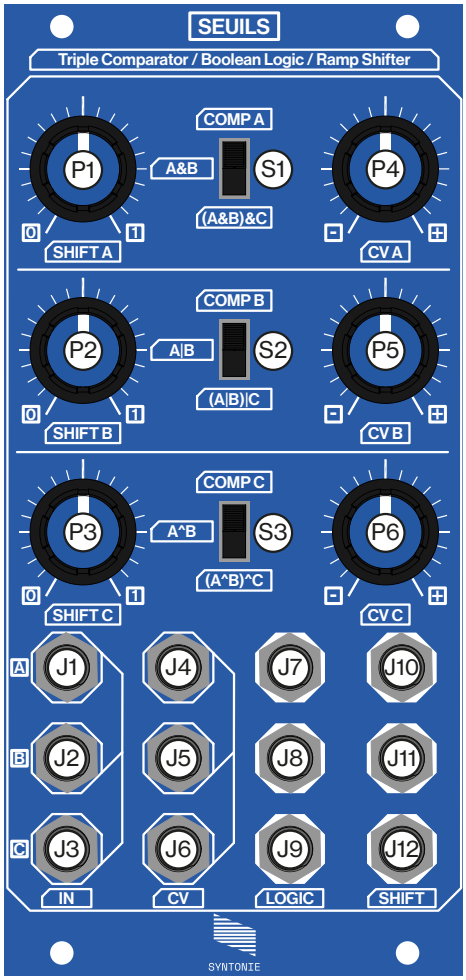


Seuils, the french word for thresholds, is a module based around a saw animator circuit, with exposed comparator output and boolean logic. It's first intent is to shift ramps on the XY axis, however, using it on more complex signals produces interesting waveshaping, further enhanced by the logic combinations between the channels.

Specifications

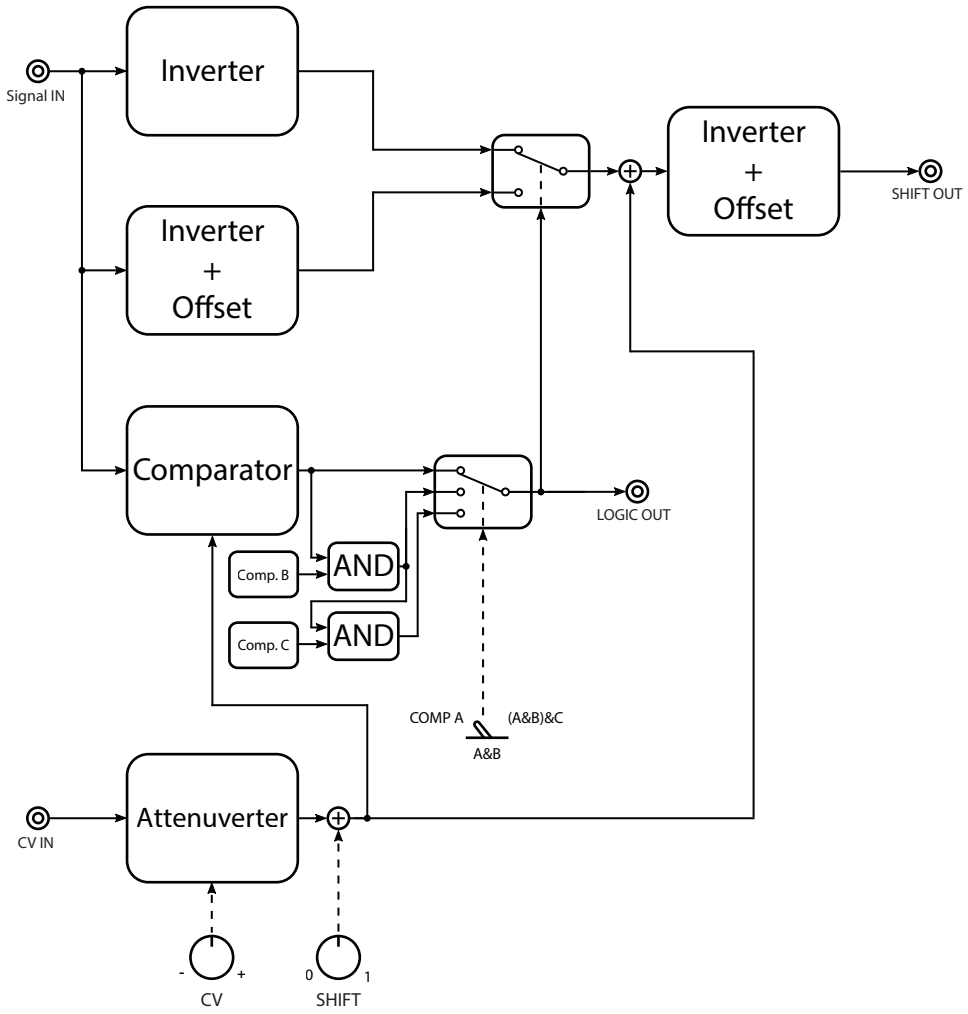
- 12HP
- 200 mA +12V (16pin or DC)
- 0 mA -12V
- 0 mA +5V
- 42mm depth

Special thanks to: **Yves Usson** for the Saw Animator design which have been the starting point to develop this module. **Lorenzo Ferronato** for the documentation design. And of course, **everyone who has supported Syntonie until now & those who will support it in the future.**



(P1) Shift manual control Ch. A
(P2) Shift manual control Ch. B
(P3) Shift manual control Ch. C
(P4) Shift CV attenuverter Ch. A
(P5) Shift CV attenuverter Ch. B
(P6) Shift CV attenuverter Ch. C
(S1) Logical AND switch
(S2) Logical OR switch
(S3) Logical XOR switch

(J1) Signal in Ch. A
(J2) Signal in Ch. B (normalled to Ch. A)
(J3) Signal in Ch. C (normalled to Ch. B)
(J4) Shift CV in Ch. A
(J5) Shift CV in Ch. B (normalled to Ch. A)
(J6) Shift CV in Ch. C (normalled to Ch. B)
(J7) Logic output Ch. A
(J8) Logic output Ch. B
(J9) Logic output Ch. C
(J10) Shift output Ch. A
(J11) Shift output Ch. B
(J12) Shift output Ch. C



Here is the block diagram of channel A in Seuils, the two other channels are identical with the exception of the AND logical operand: OR for channel B, XOR for channel C.

Signal path: the input signal is going to a comparator, which will generate a logic signal from the linear input signal, which is also known as a hard key generator in a video context. This logic signal is used to select between the inverted signal and inverted signal + offset, which, once inverted again, will result in a phase shift on ramps, and more generally a wave shaping of other signals. The front panel logic switch allows to select the raw comparator output, or logic combination of the comparators from channel A, B and C. The resulting logic signal is used to control the switch in the linear/shift circuit, but is also available at the front panel LOGIC output.

CV path: the CV signal is going to an attenuverter, which will attenuate and/or invert the CV signal, based on the position of the CV knob. The SHIFT knob allows for manual control of the shift/threshold, and is then summed with the CV signal coming from the attenuverter. This sum is used as the threshold for the comparator, which in turn, controls the amount of shifting of the linear signal. The sum of CV and SHIFT is also summed with the linear signal in order to keep it between 0 and 1V.

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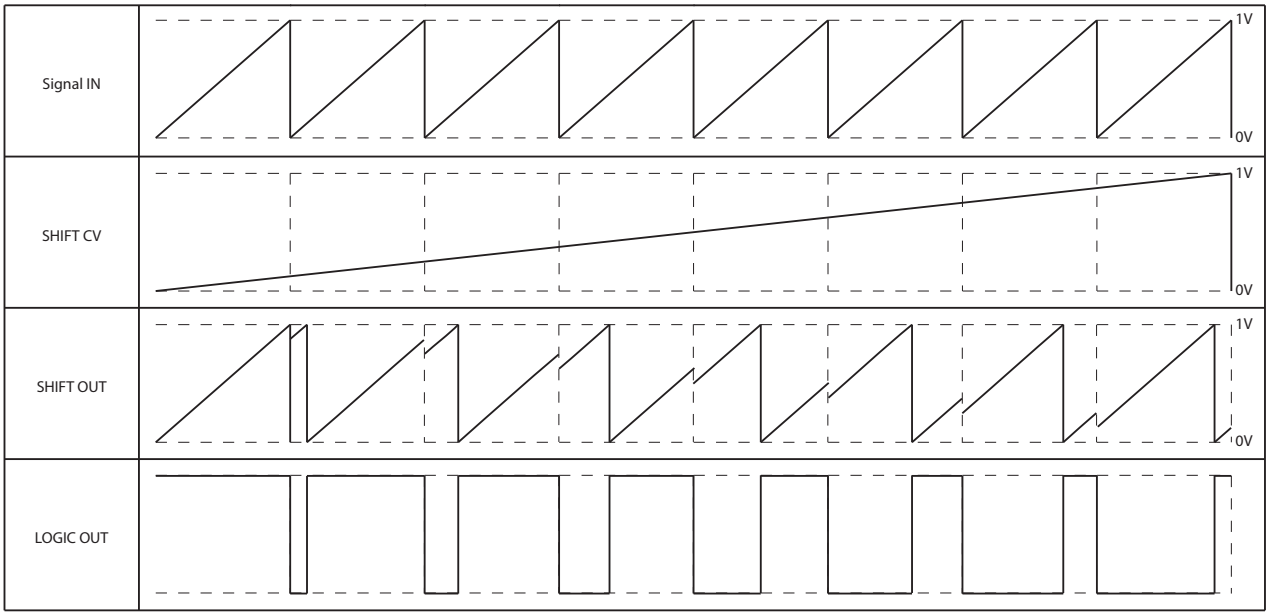
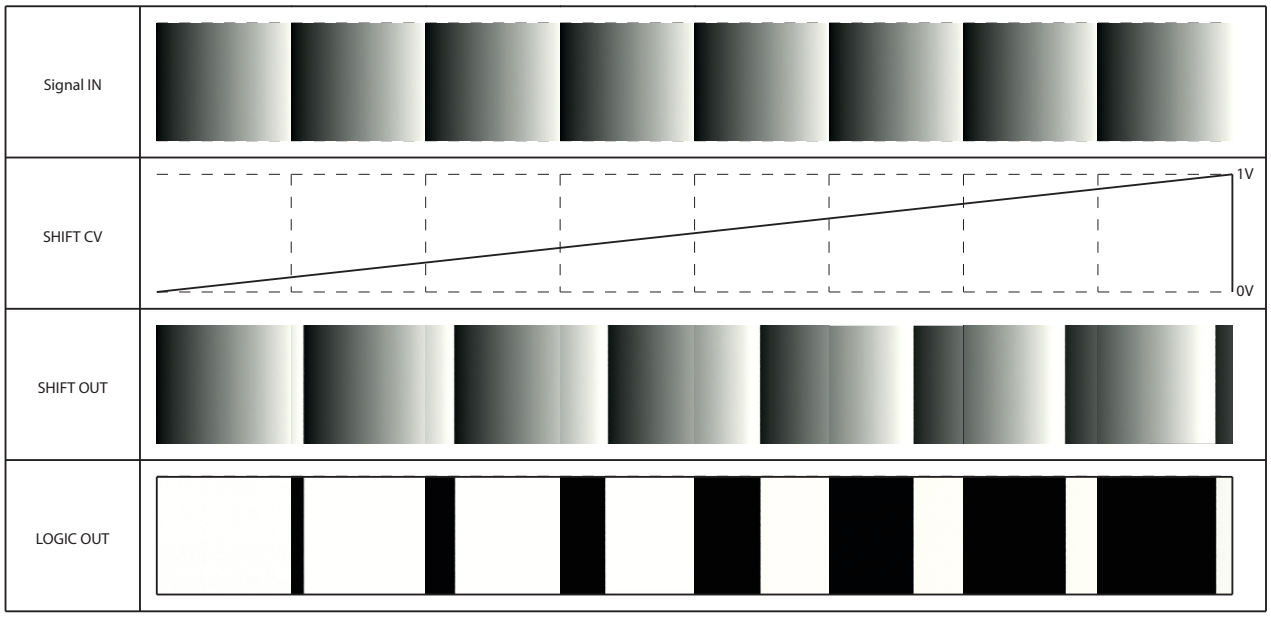
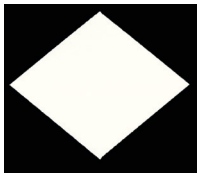
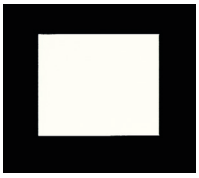
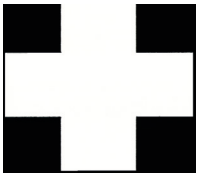
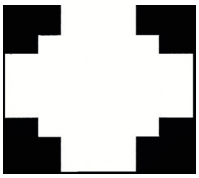




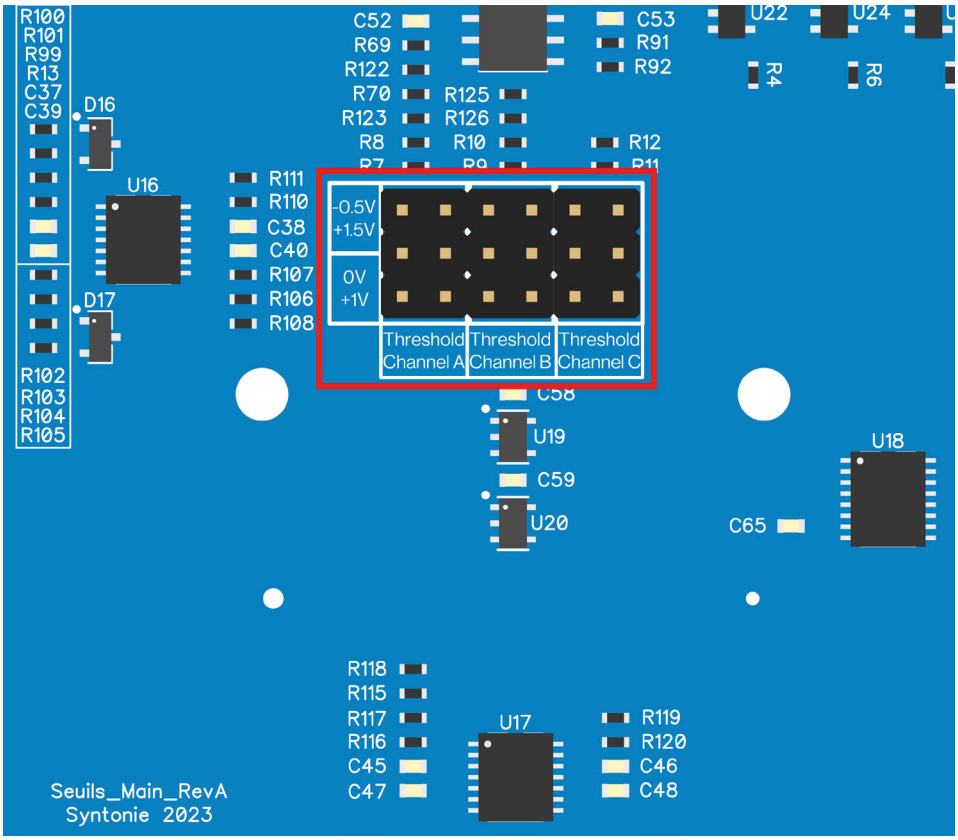
Graphic representation and video captures of the shift feature with a rising ramp as the input signal: as the SHIFT CV signal rises from 0V to 1V, the SHIFT output results in a horizontal displacement of the ramp, and also controls the length of the pulse present at the LOGIC output.

Boolean logic operations

	Channel A AND	Channel B OR	Channel C XOR
COMPARATOR			
A / B			
(A / B) / C			

Captures showing the different logic operations possible with three simple shapes from Ramps as the input (channel A -> Diamond, channel B -> Rectangle, channel C -> Cross).

Note: when setting channel C to A^B, the SHIFT knob and CV input will generate an offset on the SHIFT output unrelated to channel A and B.



Seuils has 3 jumpers accessible on the back of the module. The jumpers are used to set the threshold of each comparator individually. The default mode is 0V/+1V as this is the standard amplitude for modular video. However, it is possible that some modules generate signal under 0V and/or above 1V, in this case, the range of the shift knob won't be enough to fully key the input signal. To help with this, the jumpers can be set to -0.5V/+1.5V, however this may also cause an additional offset at the shift output, especially visible when processing a 1V ramp.

Note: if, by any chance, one of the jumpers is removed and misplaced, the corresponding channel will be set to default mode (0V/+1V). Since the 2-positions jumper are not really common, it can be replaced by 2x standard 1-position jumpers, make sure they're set on the same mode, as one jumper sets the amplitude of the input signal, and the other jumper sets the amplitude of the CV signal.

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