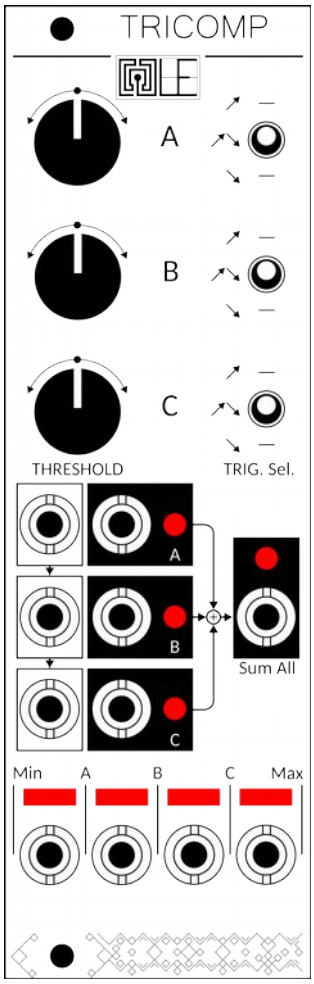
LARIX ELEKTRO

CONTROLE - TRICOMP

WHAT'S THAT THING ?

TRICOMP :
TRI for Trigger or for Three (!)
COMP for comparator.

It's a module that transforms any signal into triggers and gate signals.
It allows for waveshaping, generating complex rhythms, transforming any signal into a logic signal, etc.
You have 3 circuits A, B, and C (connected by default if nothing is connected to B and C).
3 Trigger outputs (plus one that sums all these 3 outputs) and 4 comparator outputs combining the 3 circuits.



KNOBS :

A, B & C: Threshold for each circuit
Pin are available at the back to control the threshold with a CV.
(*See Extension section, bellow*)

SWITCHES:

A, B & C: Selection of the type of trigger :
- Trigger generation when exceeding the threshold
- Trigger generation when crossing below the threshold
- Or both.

JACKS I/O:

IN (A, B & C): Any signal +/-10V (+/- 12V accepted, of course)
Signal A is routed to B and C if nothing is connected in B or C.

TRIGGER OUT : the outputs of circuits A, B, and C.

Sum All : Common output, sum of the 3 trigger outputs.

GATE : (The four bottom outputs)
Left to right :
- Detection between minimal and A threshold.
- Detection between A and B threshold.
- Detection between B and C threshold.
- Detection between C threshold and maximal value.

Typical use :

- All typical use of the comparator function
- Trigger generation for complexe rhythmic composition
- Kind of 4 steps sequencer
- Waveshaping tool, or complexe PWM.

Technical specifications:

+12V : 35mA
-12V : 22mA
(5V is not used)
8HP, 35mm deep (Approx.) with PSU connector

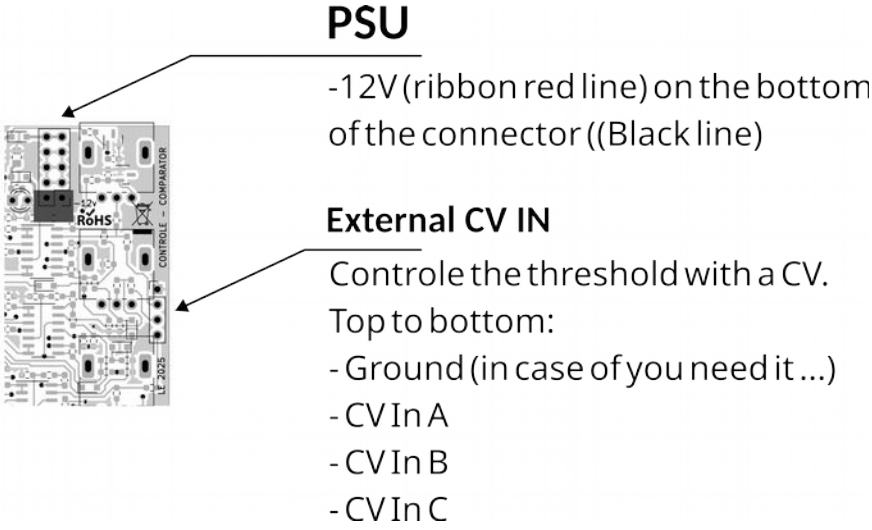
Trigger duration : 0,26 ms (Approx.)

Installation:

At first, ensure that there is enough power to supply the module.
Beware of the orientation: the red strip on the ribbon cable should match the white line on the module, and on the PSU board (-12V).
Connect the PSU ribbon into the PSU connector, the small connector (2x5 pin) into the module, and the large one (2x8 pin) into the PSU Board.

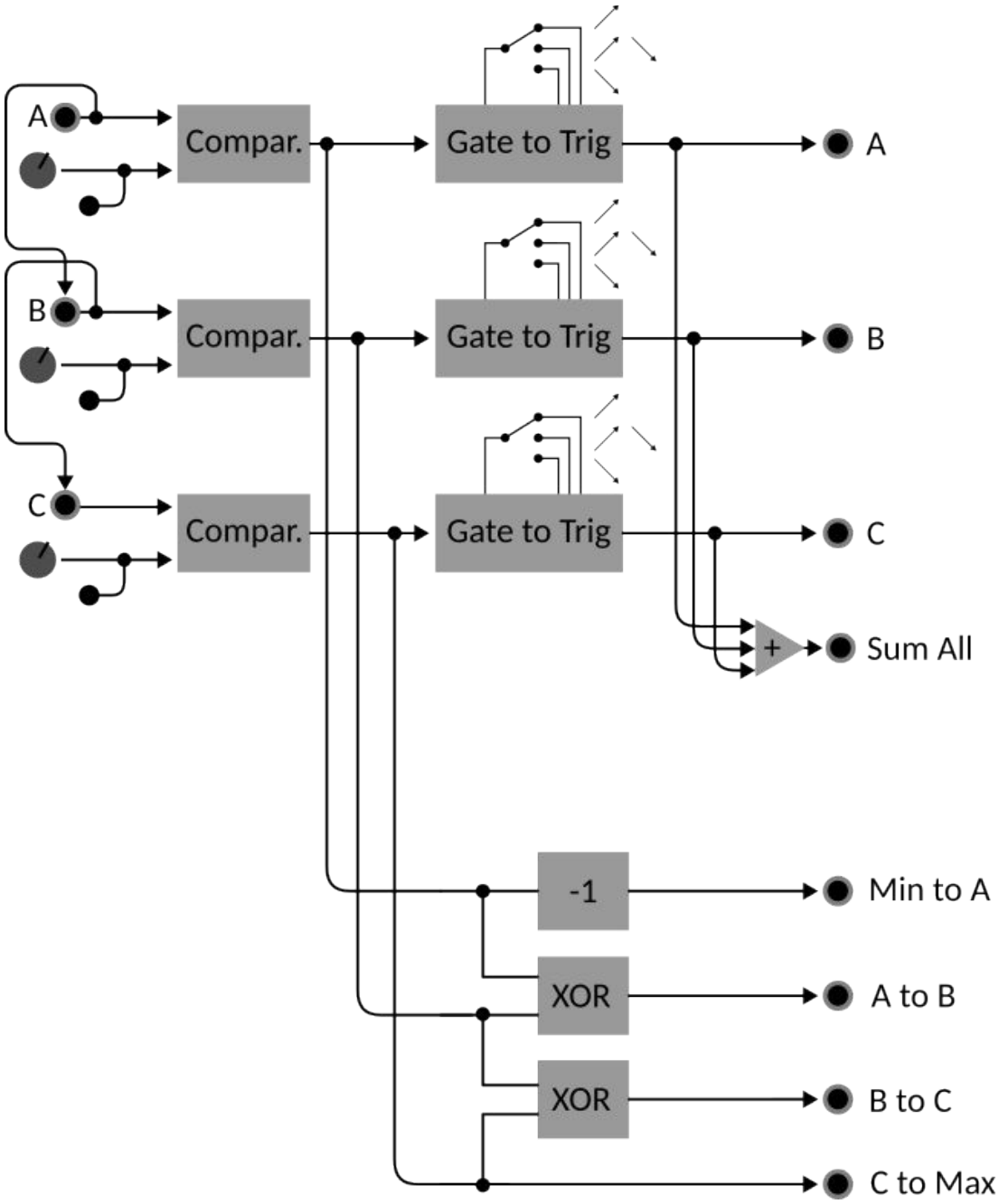
It is better to have a **well-insulated box** because parasites can be added to the signal of the modules. If you are not familiar with electronics, prefer commercial boxes. This is especially true for power supplies: a poorly designed power supply can damage the modules.

To avoid various problems, electromagnetic, but not only, **complete the empty spaces with blind front panels** (Blank panels).



For more informations about the Extension possibilities: see below.

BLOCK DIAGRAM



Concept

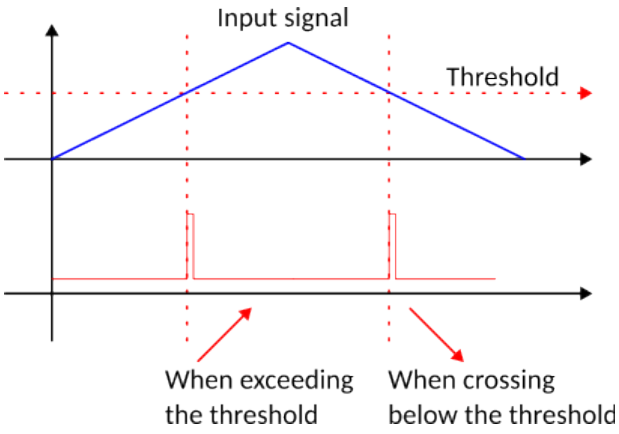
The **TRICOMP** is a comparison module. What is that???
To put it simply, when the input signal of the module exceeds a threshold, the output changes from 0 to 1 (OFF to ON, or 0 to 5V).
In other words, it transforms any signal into a logical signal.
In the Eurorack universe, a logical signal is a signal that can only take 2 values: 0 or 5V (approximately).

0 is associated with the information 0, or OFF
and 5V is associated with the information 1, or ON.

The **TRICOMP** has 3 comparators (A, B, and C).
Since there are already many (and excellent) modules in the Eurorack universe, the **TRICOMP** is designed to be a bit different.
Indeed, it has 2 sections:

- The first generates triggers (hence the name)
- The second generates classic ON/OFF signals (GATE) combining the configuration of the 3 comparators.

The first section, therefore, generates triggers:
when the input signal exceeds the threshold set by the associated potentiometer, instead of switching from state 0 to state 1, it generates a pulse.
The switch allows you to choose when a trigger is generated: either when the signal exceeds, or when it returns below the threshold, or both.



The second section is a combination of comparisons:
To explain, simply, we imagine that we have inserted the same signal into the 3 comparison circuits, A, B, and C. (It's easy because by default, they are connected to each other in a chain, from A to B, then to C, if nothing is connected to inputs B and C.)

- The first output is at 1 when signal A is between the minimum possible and the threshold of circuit A.
- The second output, when the signal is between threshold A and threshold B.
- The 3rd, when the signal is between thresholds B and C.
- And finally, the last one, when the signal is between threshold C and the maximum possible.
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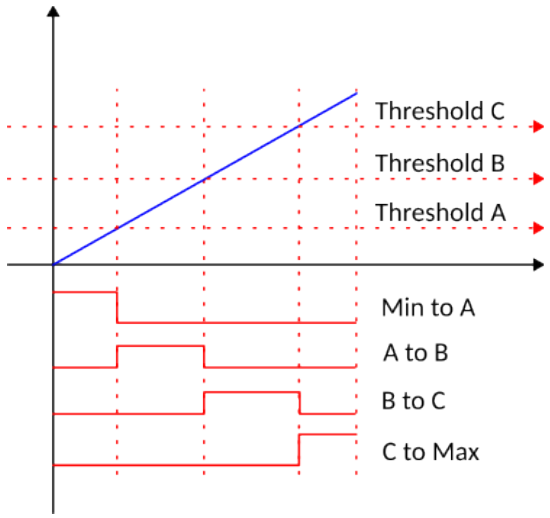
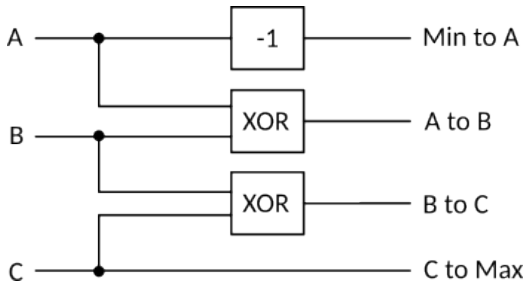
If the input signal is a ramp, and the thresholds are set to have increasing values from A to B, this allows the ramp to be divided into 4 sections.



And of course, if we change the threshold values, and even more so if we input 3 different signals in A, B, and C, then the result is even more complex! ... and creative!

For the geeks, here's how this section works, logically:

- The 1st output (Min to A) is the inverse of the comparison.
- The last output is a simple copy of the comparison value from circuit C.
- For the 2 central outputs, there is an XOR logic gate between the 2 inputs (A and B for the 2nd. B and C for the 3rd output).



An XOR logic gate is very simple: its output is equal to 1 only if one of the inputs is 1. In all other cases, either both are 0, or both are 1, the output is 0.

As a reminder, the OR gate outputs 1 when at least one of the two inputs is 1, so also when both are 1.
And the AND gate only outputs 1 when both inputs are 1.

Extension

As noted in the installation section, there is an **extension connector** at the back of the module. Like most **LARIX ELEKTRO** modules, it is possible to expand the module's capabilities by connecting another module to it. (A modularly modular system!)

Here, it is about **adding a CV input to the threshold setting**. You can choose between two modules to retreive these CV inputs :

- The **AttV-4** module, which has the same connector at the back and offers 4 attenuation circuits, can be connected.
  CONTROLE Attv-4 - LARIX ELEKTRO
- The **MULT** module, a multiple that can be used as a bank of 8 freely assignable jacks.
  CONTROLE Mult. - LARIX ELEKTRO

TIPS

This is not about making an exhaustive list of the uses of comparator modules, and of the **TRICOMP** in particular, but rather to point out a few small things.

If we use a ramp signal at the input with a known duration, then the voltage of this ramp at a given moment indicates how far (in time) we are in this ramp:
We can therefore consider **voltage as a temporal value.**
By setting the threshold, we determine when the trigger will appear.
More precisely, the threshold then defines at which percentage of the ramp's duration we are located: if we change the duration of the ramp, the threshold still maintains the same ratio.

There are clock modules that also have a ramp output. With the **TRICOMP**, and its Trig outputs, it is possible to position sound events (percussion?) wherever we want, outside of a fixed grid, but that still follow the tempo.
The **GATE** outputs, in the same idea, then define 'time windows' within the duration of the ramp.

LARIX ELEKTRO offers a module that has a ramp output associated with a clock signal:
the **TIME** module : RITOURNELLE TIME - LARIX ELEKTRO
Moreover, this one combined with the **Shift-R** allows for one side to have a ramp, and with the extension, fixed divisions of the clock, thus creating a fixed 'grid'.

Other things:

- Try with thresholds that are not arranged in ascending order, between A, B, and C.
- Try something other than a ramp (a triangle?). Or modulate the frequency of the ramp.
- Finally, try with different signals in each input…

The module can work with audio, for complex PWM: Try mixing the 4 GATE outputs together! For the TRIG outputs, the duration of the trigger pulse is fixed, it's worth noting...

HACK YOUR MODULE :

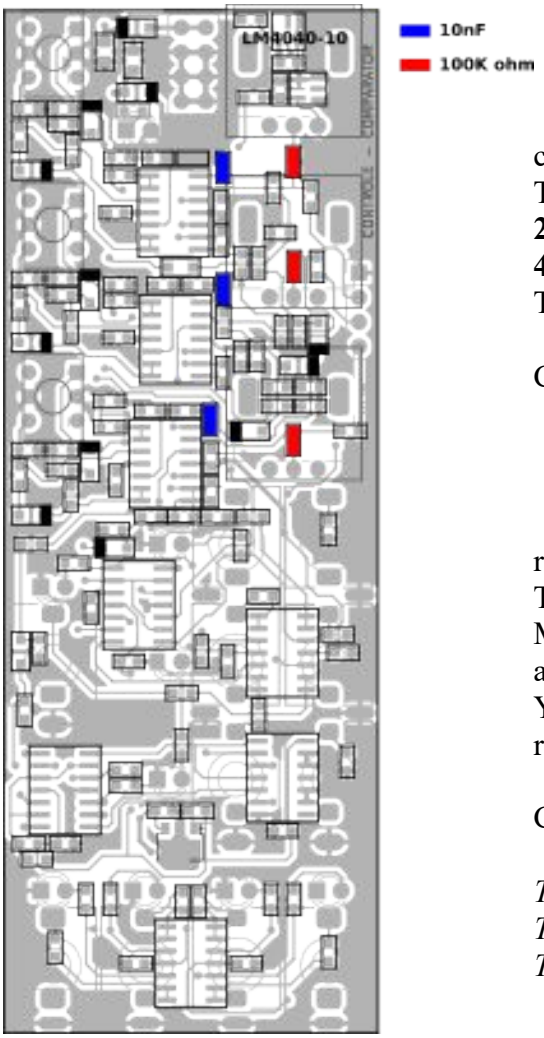
Maybe, there is some spec. You dont like :

1- The tigger is very short, adjusted to works with audio signals.
But it can be too large for very high pitch,
...or too short to trigger some modules (sequencer, some digital modules too)

2- The knob range is designed to work well when the input is a bipolar signal +/- 10V.
But, a lot of signals are 'only' +/-5V. It means that in some cases, the useful range of the knob is small...

By chance, you can change some components to fit your use.

Here the map of the PCB, and all components you can replace :



To change the trigger duration, change the **BLUE** capacitors :
The original value is **10nF**, for 280uSec.
22nF gives you a bit less than 600usec.
47nF gives you 1,2ms approx.
This is only some example, you can test other values.

Choose **0603 SMD capacitor**.

To change the range of the knobs, change the **RED** resistors :
The original value is **100Kohm**.
Multiply it by two will divide the range by 2. So it will fit a +/- 5V range.
You don't need to use exactly **200K ohm** : the usual resistor value is **220K ohm**: it's ok too !

Choose **0603 SMD resistor**.

The circuit on the PCB follows the front panel :
*The top component are for the **A** circuit*
*Then the **B** and finally the **C**.*

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