LARIX ELEKTRO

AUDIO
DUAL UNDULA OSCILLATOR

Installation of the extensions

WARNING

The module contains some extension possibilities.
But adding them is not without difficulties :
You will need to cut some track on the PCB, soldering cables or pinheaders, and twist these pin without breaking them...
The end result is a module with a lot of cables that are not very clean at the back...
It is implied here that you already have some tools: Soldering iron, wire cutters, screwdriver, cutter...

To resum : these modifications are for experienced users only !
Please read this document before.

These additions will be made around the **MULTIPLE 2** module. A module that contains 6 jacks and 2 switches.
It should not be confused with the **MULTIPLE** which does not contain switches, even if it is possible to use this module for some of the modifications. (if you don't need the switches)
The **AttV-4** module can also be used.
This documentation will explain which module can be used for each modification.

To summarize, here is the list of possibilities for adding features, which modifiation you will have to do, associated with the modules that can be used for each modification.

PCB	PCB indicator	details	Action	Module needed
VOICE	Access 1	access between the VCO and the VCA of the WF	cuting and soldering	MULT. Or MULT. 2
VOICE	Access 2	acces entre le VCA et le WF	cuting and soldering	MULT. Or MULT. 2
MAIN PCB	Q	input for Q control	soldering	AttV-4
MAIN PCB	PWM	input for PWM (square output)	soldering	AttV-4, MULT. Or MULT. 2
MAIN PCB	M1 / S1	access after LrtoMS, before selector LR/MS	cuting and soldering	MULT. Or MULT. 2
MAIN PCB	M2 / S2	access after selector LR/MS, before the VCA	cuting and soldering	MULT. Or MULT. 2
MAIN PCB	Uni/Bipolar VCA	changing how works the VCA	just twisting the pin	MULT. 2

Once again, before doing any modification, please read all the user manual and this document.

Then define which modification you think you will need, because not all access points are useful. All informations concerning the various option are inside the next part of this document.

When you've decided on the changes you want to make, you will be able to choose which module(s) you will need.

Also, you have to buy some extra things : wires, and maybe some pinheaders :
- **Dupon cable** (<u>female connector</u>) can be connected directly to the pinheader.
But you may prefer to solder the wire (stronger construction). Any small diameter wire is OK. Like something **below 20AWG** (a smaller diameter) :
20AWG is a bit too hard and may damage the pinheaders is you solder the wire in the pin.
– **Pinheader** :0,100 po (2,54mm) <u>example pinheaders</u>.
Pinheaders are not necessary if you want to solder the wire directly.

I deeply recommend to solder wires instead of using Dupont cable. Because they are fragile and disconnect easily (very bad idea if you will travel with you eurorack case!).
But at first, to test if the modification is interesting for you, starting by soldering pinheaders and using Dupont cable is a good idea.

If you don't like the modifications, it's possible to return to the original state of your module. The track you're cutting can be repaired by soldering a small wire between the two holes (or pinheaders).
Yes, your module will looks dirty, but it's at the back only;)

Ok, that's it for the beguining. In the introduction, you're having a table with all modifications available, the rest of the document is divided into 3 parts :

- The first part will explain each modifications, according to a musical perspective. To check if an extension will interest you, you can read this part only. Before buying anything.

- The second part will explain each modifications in a more technical perspective. That will help you to understand if you feel confident to make the modifications you want.

- The last one describes how to make the changes. If you are determined to make the changes, this is the chapter you will have to follow.

At the end, there is some schematics and pictures of a full modified module.

Extension, for what ?

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MAIN PCB	Uni/Bipolar VCA	changing how works the VCA	just twisting the pin	MULT. 2

VOICE Access 1 & Access 2 :
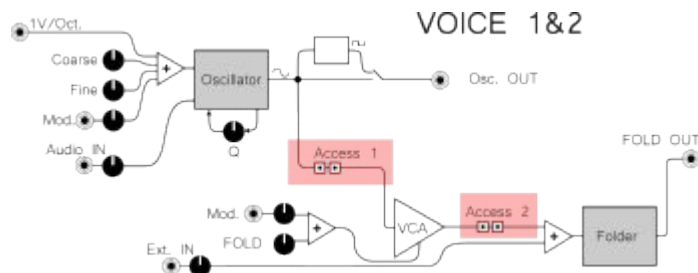
In fact, this is two access I was using during the development.

      Access 1 is the most interesting : it allows to replace the internal VCO by another signal. unlike the Ext. IN input, you will be able to control the amount of wavefolding you want with a CV (Mod. Input)

      Access2 looks less interesting. It can be seen as a second Ext. IN input. Or an output of the VCO after volume control. (In my own modified module, I don't use this access point)

Both can be seen as insert point, to add something (waveshapping?) before the wavefolder. Before or after the internal VCA.

CV Q :
Yes, there is already a CV input to control the Q, but without knob to control the amount of CV.
In the tradition of LARIX-ELEKTRO modules (!), I'm adding this kind of access to connect the Attv-4 module. It's a bank of four attenuverters with access to each output at the back.
Simply, it save you some cables at the front.

PWM :
The direct output of the VCO has a switch, to choose between sinus or square wave.
Unlike Q, there is no CV input on the front panel to control the pulse width.
With this access point, you have it ! PWM will be on your hand.

MID/SIDE processor access :

I was using these access during the development too, so...
There are two paire of accesses before or after the configuration switch :
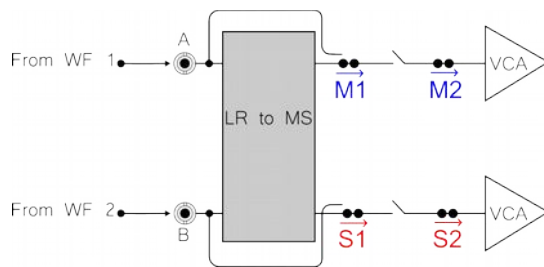
M is for Mid, or Left   **1** is for before the switch
S is for Side or Right.   **2** is for after the switch

Both are very useful as insert point. To add treatments in the Mid/Side domain (Eq?).
And also to bypass the LR to MS part of the processor. For example, you can connect the Voice 1 to the Mid, and the Voice 2 to the Side.

As you can see in the schematic, M1/S1 are before the selector switch. It means that your insert / replacement will only be considered if the selector switch is on MS !
With M2/S2, your insert / replacement will be taken into account regardless of the position of the switch.
Remide that after the VCA, there is the second part of the MS processor : the MS to LR converter.

To be honest, I prefer to use the M2/S2 instead of the M1/S1. I don't see any reason to use both paire. But who knows ?

Unipolar / Bipolar selector :

The two VCA inside the MS processor can be configured as unipolar or bipolar, via a jumper.
The idea here, is to be able to change on the front panel.

And that's it !

Extension It's all about connectors & jumper:

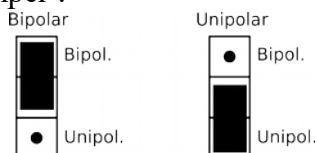*This section is a modified copy from the user manual of the module.*

The module is build with one main PCB and two voice card.
On the main PCB, under the Voice A, there is all things concerning the VCA and the MS converter.

VCA configuration :
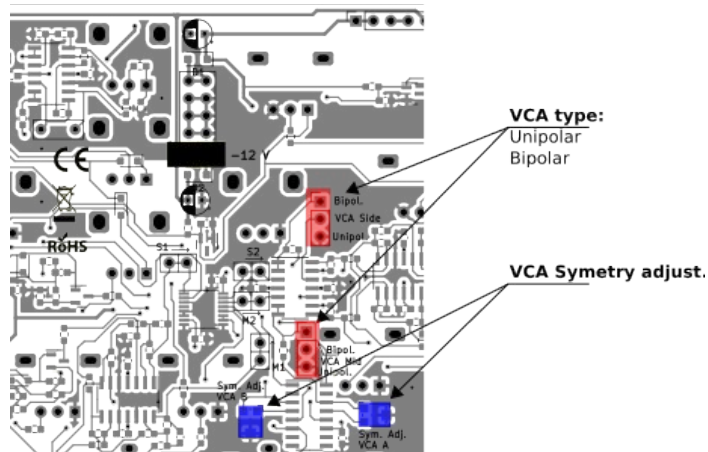
As already explained, each VCA can be configured as unipolar (classical VCA) or bipolar (default configuration), with the jumper :

On the top, the VCA-B (or Right, or Side VCA).
On the bottom, the VCA-A (or Left, or Mid VCA)

The MULTIPLE 2, with his two switches is perfect for this modification.

MS Processing, access points.
There are some holes on the PCB where it's possible to solder pin or wire.
At each point, there are two holes.

The idea is to be able to retrieve the signal after the LR to MS circuit. (M1 and S1)
And to be able to put some signal directly to the VCA without passing thru the LR to MS circuit (M2 and S2)

If you want to add this kind of « insert », simply cut the circuit between the two holes.

For what purpose? Don' t know, it's up to you and your imagination ;-)
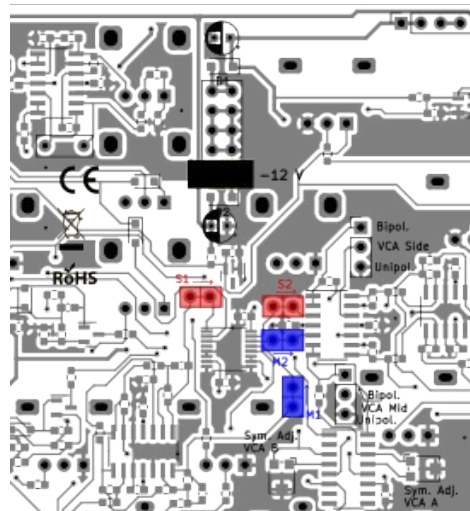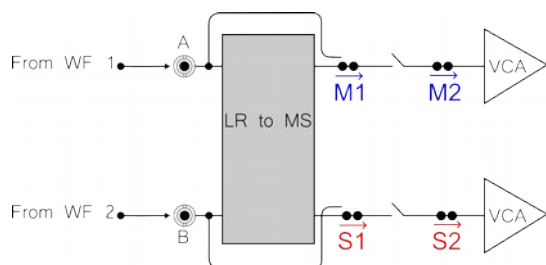
In my humble opinion, it's not necessary to use both M1/S1 and M2/S2. Just one is useful.
- M1/S1 is **before** the selection MS or LR. This connexion is useful to add a treatment to the mid and side signal, without touching to the LR signal.
- M2/S2 is **after** the selection MS or LR. This is useful to add treatment at any case LR or MS processing.

Both M1/S1 or M2/S2 can be used like an insert. Or to replace the current signal by another one.
The insert is useful to add something to the signal : maybe eq or FX.
Replacing the signal is useful to use the MS processing, and the VCA, for an external signal **without** the LR to MS converter. It means, inserting a signal that will be considered as Mid and Side signals instead of a Left and Right signals.

If you just **want to replace** the current signal, use this condiguration :
Connect the send pin into the « Norm » pin of the Jack, and the « TIP » pin into the return pin. So if no jack is inserted, the connection will still be made. And the module will work as if you had not made any changes.
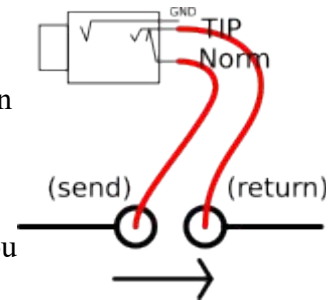
You will need just one jack. And if you do it for both circuit (M and S), you will need two jacks.
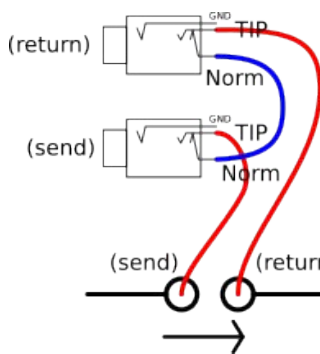
If you want to build an insert, use this condiguration :
In this case, you will need two jacks. And if you do it for both circuit (M and S), you will need four jacks, of course.
Note the cable between the two « Norm » pin.

Of course, with this configuration, you can use it to replace a signal too, simply by inserting the new signal into the return jack.

In this case, bot MULTIPLE 2 or MULTIPLE can be used. If you already need the MULTIPLE 2 for the switches, you still have 6 free jacks, so...

Access point to PWM and CV for Q :
Between the jacks sockets, there are 2 more holes for each VCO :
This is the access point to add PWM control, for the square signal. And one more CV Q input.
You just need to solder pinheaders or wire, no trace to cut here !

The **Q Ctrl** has no knobs to control the amount of CV. If necessary, you can use an external module.
To save some cables (noddles!) most LARIX-ELEKTRO modules has pinheaders on the back for all CV parameters that has no control knobs.

Use he Attv-4 for this purpose.

The **PWM** is not present on the front panel. It adds (as the name suggests) PW control to the SQUARE output, increasing the sonic capability of the module.

**If you want to adjust the amount of control, use a AttV-4.
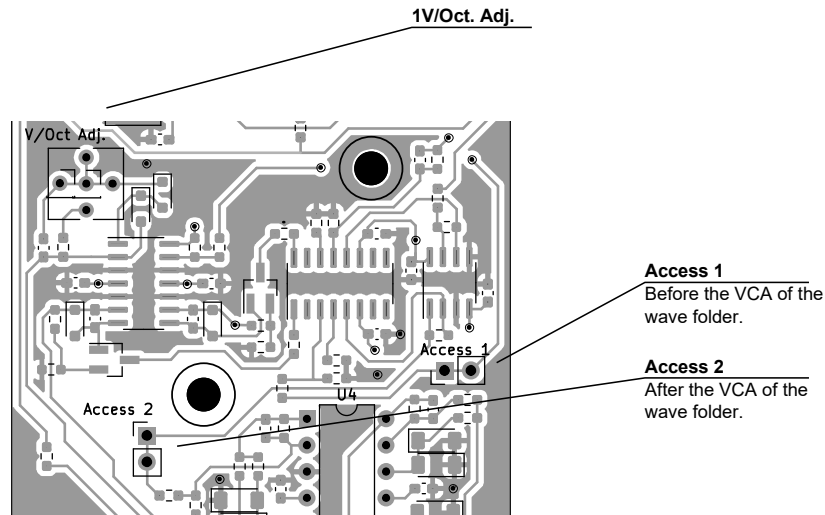But a simple jack can be necessary : MULTIPLE or MULTIPLE 2.**

Voice PCB :

The two identical PCB connected to the main PCB contains the oscillator and the wave folder.
As explained above, there is a VCA between the oscillator and the wave folder.
Two access are available, in case of somebody have some ideas :
Access 1 in before the VCA.
Access 2 is after the VCA.

As for the MS processing, you have cut the circuit between the two holes, and solder a pinheaders or a wire.
As for the MS processing, you can decide if you only want to replace (so adding one jack) or have an insert (so adding two jacks).

In my humble opinion, it's not necessary to use both access. The Access 1 is maybe the most interesting because it allows another signal to be controlled by a CV.

Both MULTIPLE 2 or MULTIPLE can be used.

How to do these modifications

All the Access points :
- Voice PCB, Access 1 & Access2
- Main PCB, M1, M2, S1 S2

Before soldering the pinheaders or your wire, you have to cut the trace on the PCB between the two holes.

Take car to not cut another trace.
(And pay attention to your fingers!)

You can verify that you're completely cutting the trace with a multimeter.

One more things : Clean the PCB well to prevent the track dust from getting lodged between the pin of a component and creating a short circuit.
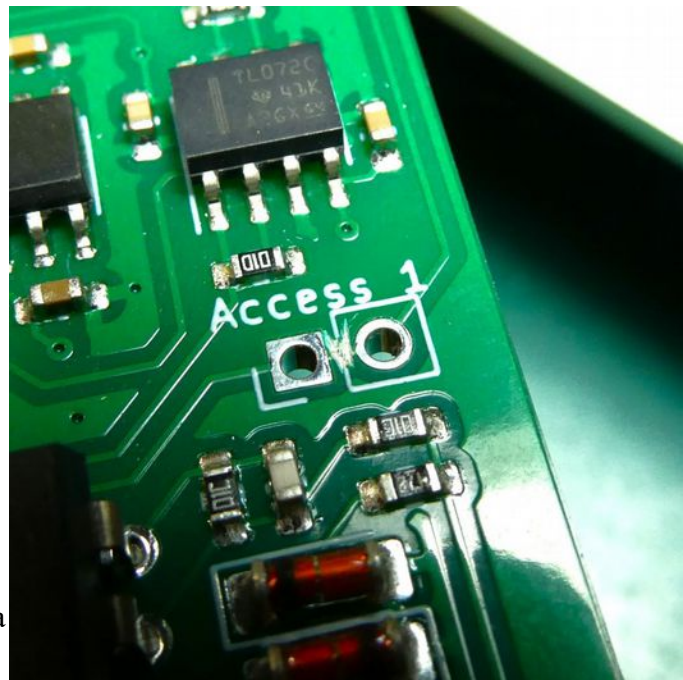
Then you can solder the pinheaders, or your wire directly, as you want.
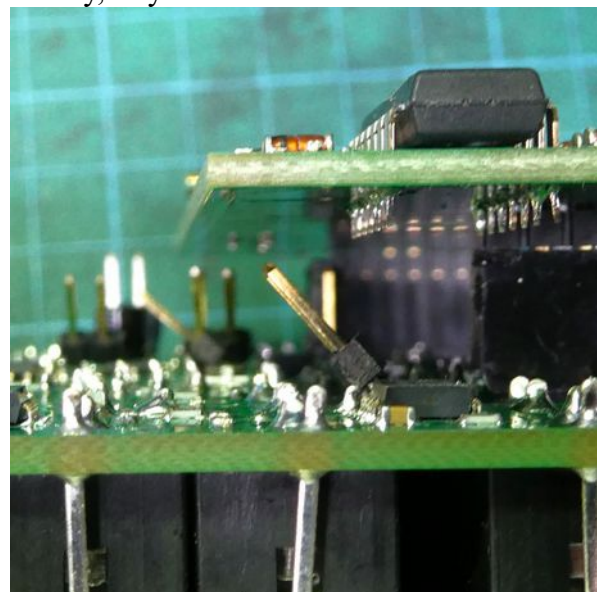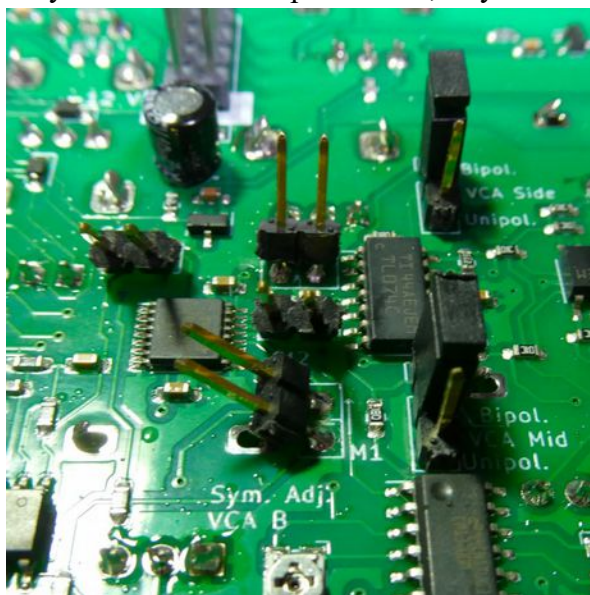
A good tip, for the pinheaders under the voice PCB : Soldering the PINs askew, because there is not a lot of space between the two PCB.   (*Yes, I know, sorry for this bad design...*)

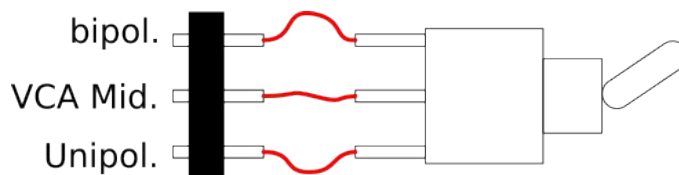Even more ,twist a bit the pin :
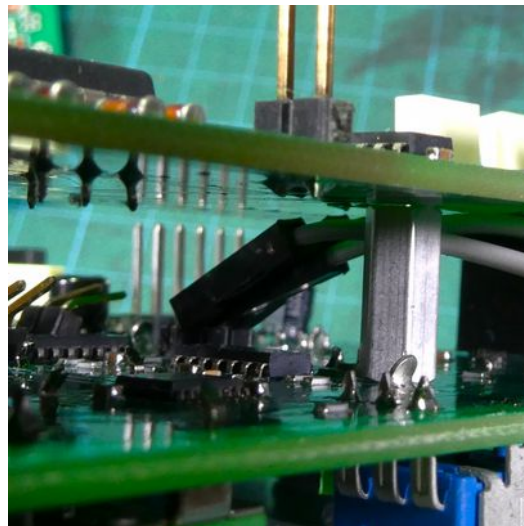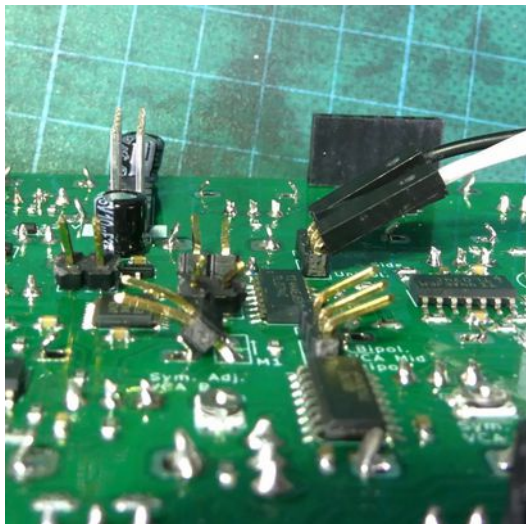
When twisting the pins, be careful not to break them!
Of course, if you prefer to solder cables, you will not have this problem...

VCA configuration :
Remove the jumpers.
As for the other pinheaders, you will need to twist the pins, be careful not to break them!

Then insert you cable, (or solder it) in this
order :

All other options : Q and PWM connexion
There is no need to cut any tracks on the PCB, simply solder pinheaders or directly the wire.
Soldering the PINs askew, because there is not a lot of space between the two PCB.

*And that's it !*

Wires instead of Dupont cables :

As explained at the beguining, I highly recommend soldering the wire, instead of using Dupont cables. It's far more solide.

Dupont Cable are useful to check if the modification is worth it. And then it's better to replace them by cables.
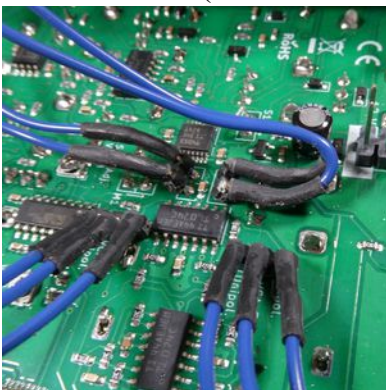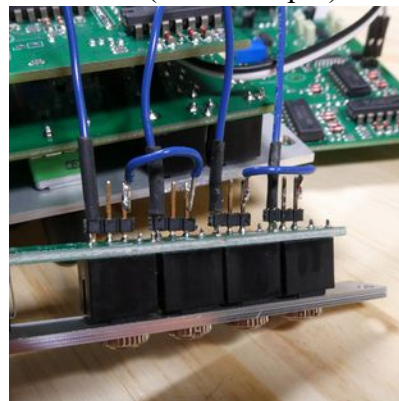
Solder the cable to the pinheader
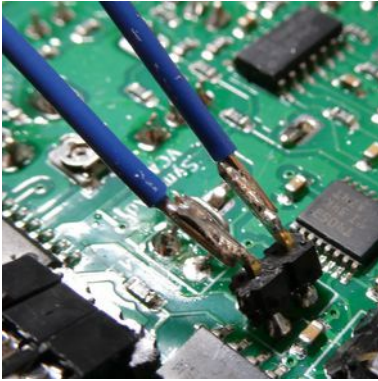
I recommend using heat shrink tubing to avoid short circuits
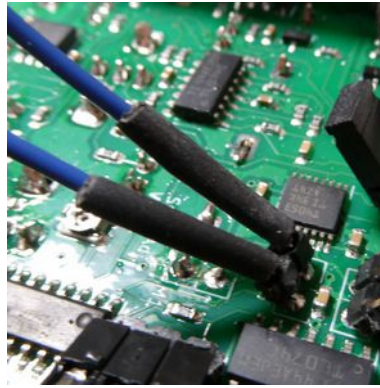
Here the result (around M2 and S2)

The MULTIPLE side.
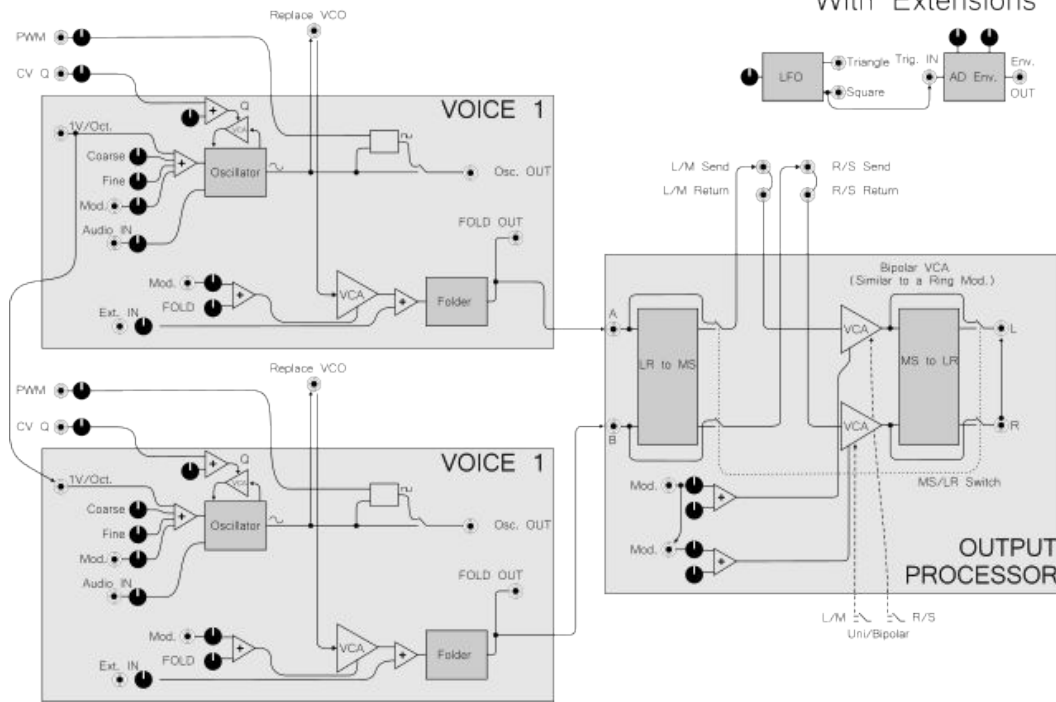Note the cable soldered between the 2 jacks
(« Norm » pin)

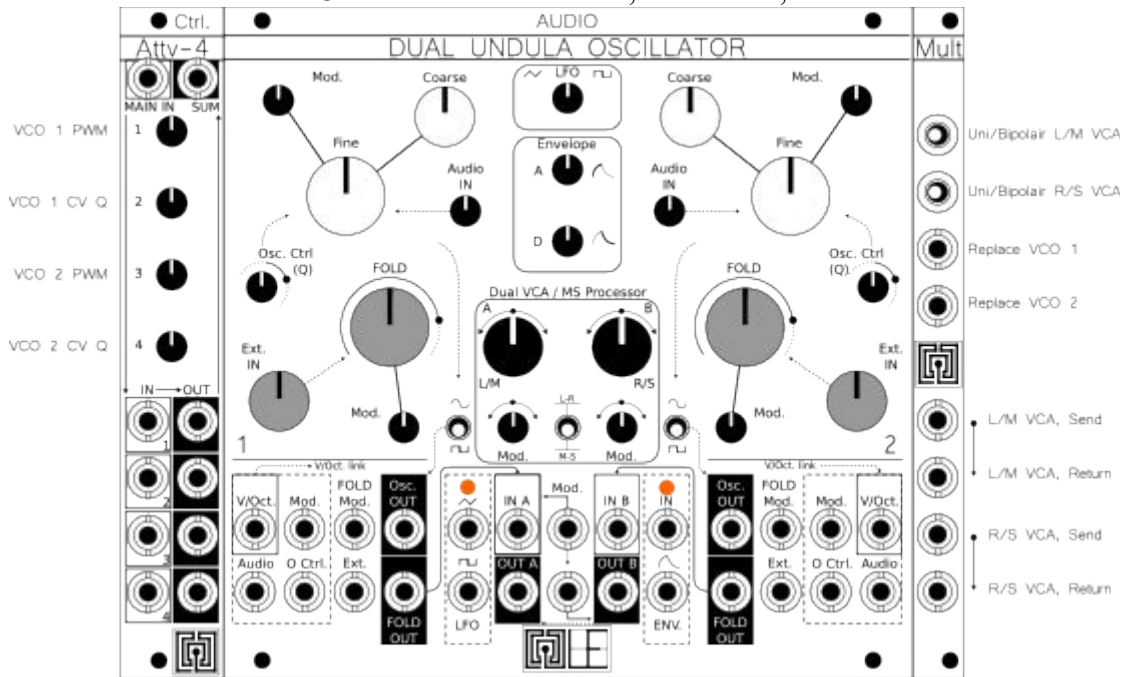The final result : As you can see, it's a bit full of noddles !

Here the schematic with all the modifications :

The 3 modules used : Attv-4, UNDULA, Mult.

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www.larix-elektro.com