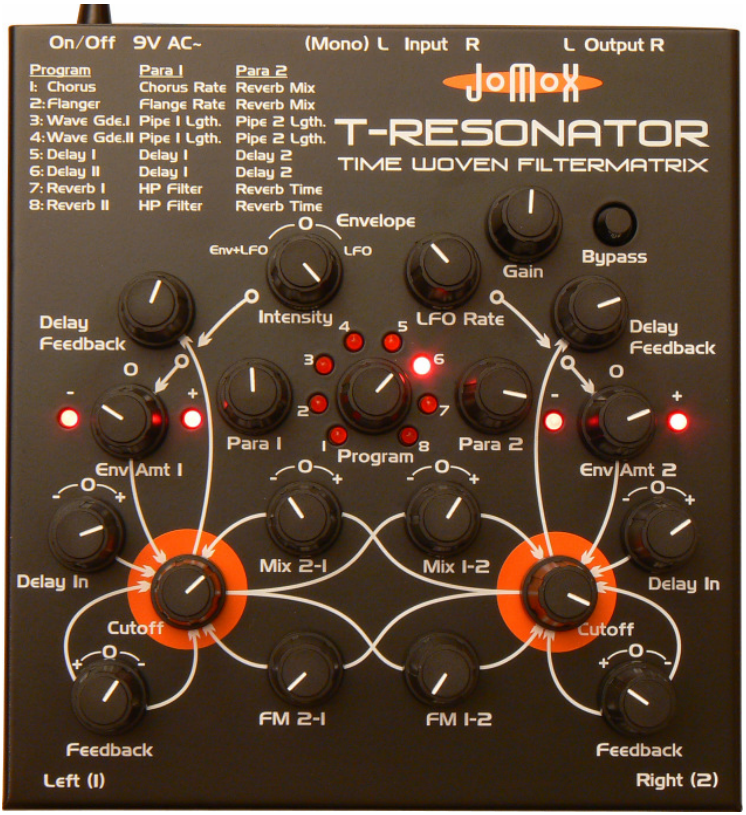


JoMoX

T-RESONATOR

TIME WOVEN FILTER MATRIX

Operating Manual

Thank you for using the Jomox T-Resonator! We hope you will enjoy this unique device and have lots of entertainment with it.

"T" stands for "Time".

„The T-Resonator transforms timely events into an analogue feedbacked filter network."

● What does that mean? The T-Resonator is a feedbackable stereo filter made up from analog circuitries with an integrated stereo digital delay. The delay which has analog feedback loops too is literally "woven" into the circuits.

● The stereo filter contains every possible internal feedback track tweakable as *Feedback*, *Mix 1/2* and *FM1/2* with a dedicated knob for each of them.

● The filters are two 4 pole 24 dB/octave transistor ladders entirely made up from discrete parts.

● 8 different chorus/delay/reverb algorithms can be chosen for the delay section which has 2 independent delay lines with different delay times and feedbacks. The delay times reach from less than 1ms to 1 second, range and structure depending from the chosen algorithm.

● Moreover, the T-Resonator contains a sine LFO that can run alone or being shaped by the audio envelope. All is controlled by a single knob. In center position the amount is zero, to the left it's audio-enveloped LFO, to the right it's LFO running free.

● The sine LFO gets retriggered by the audio signal depending from the input gain. The envelope is generated by an audio envelope follower. LFO and envelope can be combined.

● Extremely versatile modulations are possible by this unique structure.

● The delay feedback goes back from the outputs of the analog filters into the analog inputs of the delay line.

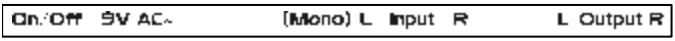
● You can easily create seasawing analog echoes, Klingon or alien insect voices by extreme feedback or membrane-like sounds by "wave guide" algorithm and many more.

● By the analog feedbacking everything sounds organic. The screaming analogue feedbacks can repeat themselves by delay and create new sound patterns by layering.

How to hook up the unit

Before connecting please turn off all other devices.

On the back side of the T-Resonator you will find these connections:



Power supply:

Please connect the provided wall wart adapter to the 9V AC~ power jack. If, for any reason, you cannot use the orginal wall wart adapter, please take care to use an alternate current power supply with 9V AC~ 500mA.
Never use an AC/DC adapter as the M-Resonator might get damadged!

Audio inputs:

Please connect the audio signals to be processed here. If you only need a mono signal, please use the left input printed (Mono) L.
The T-Resonator has Hi-Z (high impedance) inputs. That means you can plug in an instrument like an electric guitar or a bass directly to the inputs without any loss in sound. The gain reserve is enough to amplify a weak guitar signal to drive the filters.
But also unbalanced line audio signals of practically every level can be processed.

Audio outputs:

The output signals of both filters are split out here. **Caution:** On some settings of filter feedbacks extremely loud and powerful bass signals or feedback sounds may occur that can damadge your speakers or ears unless you haven't taken care by a limiting unit or a lower mixing level!

User Interface Analog Section

Gain:

Adjusts the sensivity of the input. If the signal overloads the input, all 8 LEDs of the program selection will light up. The unit is resistive against overloading though. You can (ab)use the distortion of filters creatively without having to fear that the T-Resonator gets damadged.

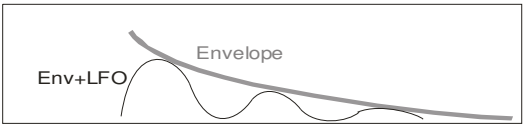
Bypass:

If this button is pressed, the processed signal is on the outputs. If it is released, the input is bypassed to the output.

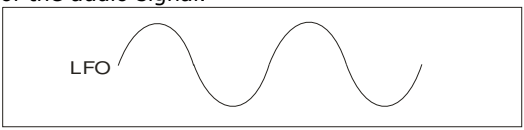
LFO Intensity:

Here you can tweak the intensity of the LFO/envelope signal. In center position the intensity is zero.

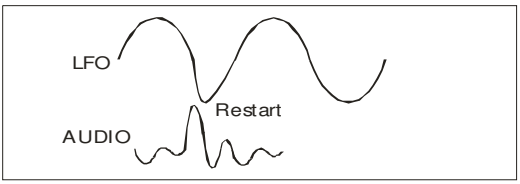
When you turn left, the resulting modulation signal is a combination of audio envelope and LFO. The envelope masks the LFO. So the signal is dependend of input signal and LFO.



Turned to the right, it is the free running LFO alone, independently of the audio signal.



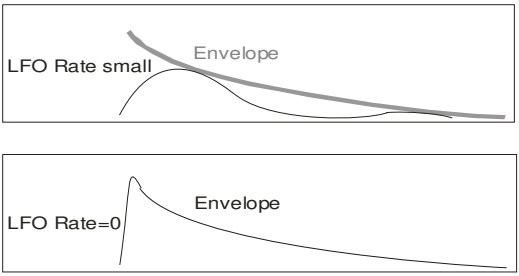
By an audio signal peak the sine LFO wave gets restarted. The treshold is firmly given and can be varied by the adjustment of *Gain.*



LFO Rate:

This parameter controls the LFO frequency (period) from about 0.15Hz (7sec) to about 22Hz (45ms).

If *LFO Rate* has been adjusted very small, only the envelope determines the resulting modulation signal with *LFO Intensity* turned to the left.
So it is possible to seamlessly tweak between a pure envelope signal and an LFO-modulated modified envelope signal.



Env Amt 1:

This knob determines how the envelope signal modulates the cutoff frequency of the left filter (Envelope Amount). In center position, the cutoff of the filter is not changed. The more you turn it to the right, the more the filter cutoff gets opened, and the corresponding right LED lights up. If you turn it to the left, the filter gets closed in the rhythm of the envelope signal. In this case the left LED lights up.
The LEDs show the phase of the modulating signal. If *LFO intensity* and *Env Amount* are higher leveled, both LEDs may light up alternating on sine LFO. They light up in the rhythm of the phase of the modulation signal.

Env Amt 2:

Same like Env Amt 1, only the cutoff frequency of the right filter is changed.

Mix 2-1:

With this knob you can mix the output signal of the right filter with positive or negative phase into the left filter. At center position the intensity is zero.
By this knob you can individually control the cross feedback of both filters. Depending on the other parameters, little deviations from the midpoint may lead to rather extreme changes of sound.
Especially interesting are counter-phase settings, that means when *Mix 1-2* and *Mix 2-1* are opposingly turned. Then, by interactive phase cancellation, very narrowbanded screaming filter modes apply whilst equally levelled settings create strong bass enhancements by phase doubling.
It's up to trial and error!

Mix 1-2:

Same with Mix 2-1; Opposing to this the ouput signal of the left filter gets mixed into the right filter.

Cutoff:

These knobs change the corner frequency of both low pass filters. The more it is turned to the left, the more dull the signal gets (high frequencies get filtered).
Turning to the right opens the filter. However, other parameters do also affect the cutoff, i.e. by modulation.
With cutoff you just set the basic value on which the other modulations add or subtract.

Feedback:

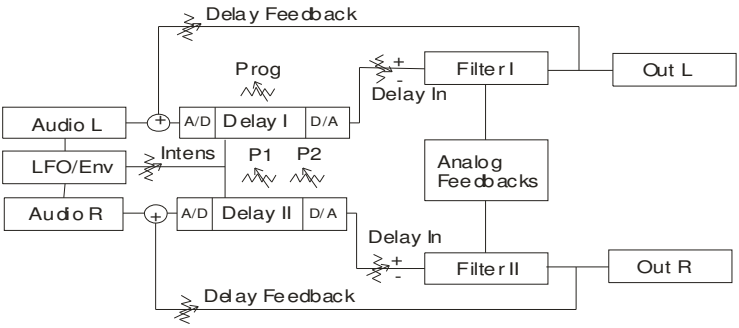
In center position there is no feedback. Turning to the right resembles the regular resonance of a normal music filter. If you turn it to the left though, the filter reaches a fairly unstable state by positive feedback. Vibrations appear that ar similar to LFOs, and in extreme positions very deep bass tones can result.
Caution: On some adjustments very deep and strong bass signals may occur that might damadge your speakers or ears if you don't care for a signal limitation!

FM 2-1:
This knob controls the amount of frequency modulation from the right filter output to the left filter cutoff frequency. Turned fully counterclockwise, the amount is zero.

FM 1-2:
Same with FM 1-2, only that the left modulates the right filter.

User Interface Digital Delay Section

The build-in digital stereo delay takes a part of the input audio signal and passes it through its various delay, chorus or reverb algorithms.
The output signal from the delay can be fed into the filter with positive or negative phase by the knob *Delay In* (1+2).
Then, the knobs *Delay Feedback* (1+2) feed the analog signal from the filter back into the analog input of the delay.



Program:

This knob chooses the delay program. One of 8 LEDs arranged in a circle light up for the currently selected program.
Both parameters *Para 1* and *Para 2* have different functions and ranges for different programs.
Also the LFO may modulate single parameters in various programs.

Please find more informations about the different programs in the following table:

No.	Program	Description	Para 1	Para 2	LFO/Envelope
1	Chorus / Reverb	Stereo Chorus Program	Chorus Rate	Reverb Mix	Chorus Intensity
2	Flanger / Reverb	Stereo Flanger Program	Flange Rate	Reverb Mix	Flange Intensity
3	Waveguide I	4 short wave pipes (delay lines) delay range 0.6-30ms	Pipe 1 length	Pipe 2 length	Pipe 3+4 length
4	Waveguide II	6 short wave pipes (delay lines) octave and 5th pipes	Pipe 1 0.6-30ms	Pipe 2 0.3-15ms	Pipe 1-6 length (weak)
5	Delay I	2 equally long delays 3ms-0.5s	Delay 1	Delay 2	
6	Delay II	One long delay + one short delay	Delay 1 3ms-1s	Delay 2 0.6-60ms	
7	Reverb I	Reverb program 1	HP Filter	Reverb Time	LP Filter
8	Reverb II	Reverb program 2	HP Filter	Reverb Time	LP Filter

Para 1 / Para 2:

These knobs adjust the values for the defined parameters in the delay programs.
Please note that in some programs the *LFO Intensity* has also an effect on the delay program.

Delay In (1+2):

With this knob you can mix the output signal of the one delay into the one filter with either positive or negative phase. In center position the intensity is zero.
As described at *Mix 1-2*, you can obtain interesting effects by phase cancellation or doubling of the both delay lines.

Delay Feedback (1+2):

Controls the feedback from filter output to the input of the digital delay. Turned fully counterclockwise, the amount is zero.

Quick Start Guide

Turn both *Env Amounts*, *Mix2-1*, *Mix1-2* and the *Feedback* knobs to center position, turn both *FM* knobs fully counterclockwise.
Turn *Delay In* on both sides to center position and select *Program 6* (Delay II), *LFO Intensity* to 3 o'clock position, *LFO Rate* to about 11 o'clock and *Gain* to center position.

If you assert a line level signal to the inputs and tweak the cutoff knobs, the M-Resonator will act like a normal stereo low pass filter.
Now let's look at the feedback knobs.
A turn to the right produces the known filter resonance whisteling, but in the opposite direction the knob creates a totally different reaction.
At low amounts you can hear a gained bass until the filter starts to create very deep vibrations like a bass tone. Welcome Godzilla!
Re-center them again to get a neutral position.
Turn both filter cutoffs to center position. As soon as you turn the envelope amounts to the left, the filters start to open and close in the rhythm of the LFO.
You can watch the LFO on the LEDs. If you turn *Env Amt* to the right, the phase of the LEDs (and that of the filter cutoff) changes. Watch and hear the filters close and open to the rhythm of the LEDs.
Now turn *Delay In* on the lefthand filter a little bit to the left. You can hear the echoed input signal. With *Delay Feeedback* you can control the number of echoes, with *Para 1* the delay time.
You can do the same for the right side, but it will sound different because in the chosen program there is only a very short delay on this side.
Just crank up *Delay In* and *Delay Feedback* on the right filter. Now give a little *Mix 1-2* and *Mix 2-1* counterwise, and the little box will already start to produce pretty weird sounds;)

Most of the other knobs cause very complex interactions between both filters and therefore it is not possible to describe these actions in an easy way. They are very much dependend from the audio material and knob settings relative to each other. Sometimes only a very little change of angle of one knob causes the whole sound to change into something totally different.
At this point we like to encourage you to tweak and twiddle and experiment with this unique filter box. Note that the structure of the stereo filter is symmetrical. So it is very interesting to create "mirrored" knob settings that feed back signals in both ways and form the 2 filters into a multi-resonant complex feedback machine.

Have fun!

And finally...

Service, tips and tricks:

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May you have lots of fun and success on creative twiddeling with our products!

Berlin, January 2008
Jürgen Michaelis