



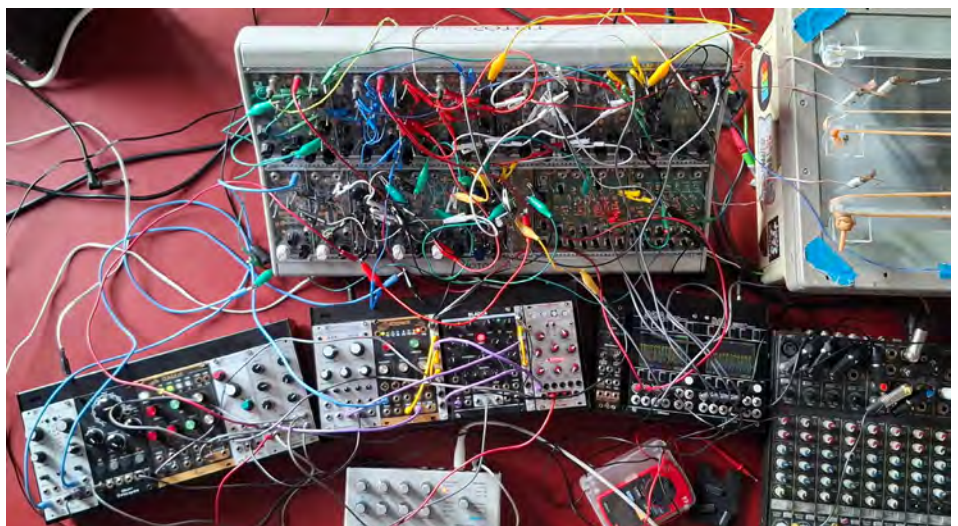
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A performance featuring idiosyncratic miniature electronic machines that combine autonomy and interaction in a fascinating way. Dancing on overhead projectors, their sound and movement enter into a complex interplay that is both audible and visible: danceable polyrhythms meet a hypnotic shadow play of mechanics and light. Analog oscillators control self-organizing dynamics—a living system of sound, movement, and image emerges.

Doing Things Over and Over Again

Since more than 20 years I have been working with the same circuit, the bi-core oscillator, an analog circuit to drive critter-like walking robots, developed by Mark W. Tilden in the early nineties of the last century (Hasslacher & Tilden 1995). Why do I stick to a single circuit for so long? Over the years I have been following the advice of Heinz v. Förster, engraved in a beautiful track “noch einmal” (once more) by Ester Brinkmann: “please never say: this is boring, I know this already, this is the biggest catastrophe, always say: I want to experience this again” (Brinkmann 1998).

Fig. 1. The Performance setup: bi-core modules integrated into a modular Eurorack.



Doing the same thing over and over again is a special path of discovery. My first contribution to the xCoAx conference in 2013 was a lecture where I used these circuits to convey insight about embodiment (Faubel 2013). I can't count how many times I have redesigned bi-core circuits as PCBs, my latest versions are Eurorack compatible and thus easily integrated into a modular Eurorack synthesizer setup. This change has heavily impacted my performance practice and I am getting to a point where people feel seduced to dance to my set.

Keywords: Embodiment,
Analog Electronics, Emergence,
Self-organization, Polyrhythm,
Machine Choreography.

An Invitation To Dance

This is an invitation to dance, to dance together with machines, machines of a different kind, non-deterministic, machines that blur the line between the animate and the inanimate. Electronic pulsation in a network of more than 30 artificial analog neurons, emergent polyrhythms as a result of mutual connectivity, feedback as core principle is what makes motors dance with rubber bands. The network is autonomous, it pulsates without human intervention, playing with it relates to the very nature of playing as an act of discovery and dialogue.

As a performer I co-create the score through careful adjustment of a multitude of parameters. The music literally emerges, patterns snap in, phase locking produces polyrhythmic beats, a change of parameter destabilizes and leads to the locking onto a different pattern. The main ingredient of this wild patch are dynamics, at the core is time, the passing of time and timing, the physical discharge of current, the non-linearity of semiconductor material, the voltage drop when motors hit a physical resistance. Every detail matters, nothing is abstracted away for the sake of stabilizing a symbol, there are no symbols, no representation, no code, no script, but a ritual, a taming of wild electronics.

While the rhythmical structures of electronic music are usually realized with a step-sequencer, that inherently encodes music as discrete events attached to symbols, a zero or a one, a sound produced or skipped, here the polyrhythmic patterns emerge as a result of a subtle exchange of electronic forces that lead to synchronization effects. Such synchronization effects can only appear in analog systems, digital systems do not have access to such phenomena, exactly because of their underlying symbolic structure and the limitations of their operational model the Turing machine (Faubel 2020).

The machines are sympoietic in Donna Haraway's sense (Haraway 2020), sound and music are co-created through entangled, non-hierarchical relationships—where the performer, the machine, and the environment cannot be separated. My practice in working with these machines as well as my attitude towards them have changed over time. In the beginning I was fascinated by the autonomy, little critters creeping on the floor, manifestations of the idea of autopoiesis, almost living machines. Performing with the machines has shifted my focus and fascination, away from their autonomy towards a curious approach of interaction, manipulation and observation. I have become aware that this relationship with a machinic system is better characterized by considering it as a sympoietic relation, just as Donna Haraway frames it, when she quotes M. Beth Dempster with her definition of sympoiesis:

Collectively-producing systems that do not have self-defined spatial or temporal boundaries. Information and control are distributed among components. The systems are evolutionary and have the potential for surprising change. (Dempster qtd. in Haraway 202)

When you dance, a strategy for enjoyment is to try to mute your inner critic and rather focus on your breath and heartbeat, the two rhythms that keep you alive. The pulsation of your heart is created by a nervous network that communicates with your brain and the neurons involved are in principle not different from those in the brain. Similarly, what makes your arms and legs move rhythmically are neural networks located in your spine. Metaphorically the network of 30 artificial analog neurons driving the polyrhythmic movements are the spine and heart.

Unstable Setups and Deliberate Vulnerability

The setup is meant to be unstable and during performance I deliberately put myself in a vulnerable position, many things can go wrong, some things go wrong. I place motors and holders of rubber band on the screen of the OHP using suction-cups, no precise placement is possible, motors need to be re-adjusted and can also be rearranged on the fly. Having such an unstable setup is a deliberate choice.

The same is reflected by the analog circuitry driving the motors, while the basic bi-core oscillator is very robust, allowing the performer to adjust both movement, the hitting of the rubber band and the consecutive break. But when 15 oscillators are mutually connected in a wild patch, the system is on the edge of stability and sometimes an oscillator stops working, or it takes 3 minutes before the oscillators go into a coordinated pattern.

I embrace this vulnerability, because it is where liveliness and adventure are to be found, it requires a ritual and an openness of all senses, attentive listening and relaxed attitude during the performance, switching off the brain, helps.

Fig. 2. A video from a previous performance (November 2025) (<https://makertube.net/w/66snvCozVLc7CXBkWhH7nj>).



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