Circuit Board as Design
Eduardo Rosario

The main job of the copper traces on a circuit board is to route signals from one point to another, typically with a minimum of fuss. But artists often lay out boards differently: why should a printed circuit board be any different than an etching or a silkscreen, an opportunity for creative expression? Why not embrace the fuss? Here's a small gallery of recent circuits that deviate from the usual straight lines.

Thessia Machado is a Brazilian sound and visual artist based in New York. Her work is mainly concerned with the material aspects of sound production. The sonic presence in each of Machado's pieces is the result of the complex rearrangement of a series of simple components, one part of which is the PCB's she designs for many of these. *Connectors* (figure 1) shows the artist's awareness not only of the aesthetic qualities present in arranging traces but also in their arbitrariness, which is further enhanced by the irregularities in the seemingly hand-drawn lines. *Translux* (figure 2) and *Interference* (figure 3) both inhabit an area between sculpture and instrument that permeates most of Machado's practice. *Translux* echoes *Connectors* in its traces for photocells. *Interference* is stricter in its ordering of space.

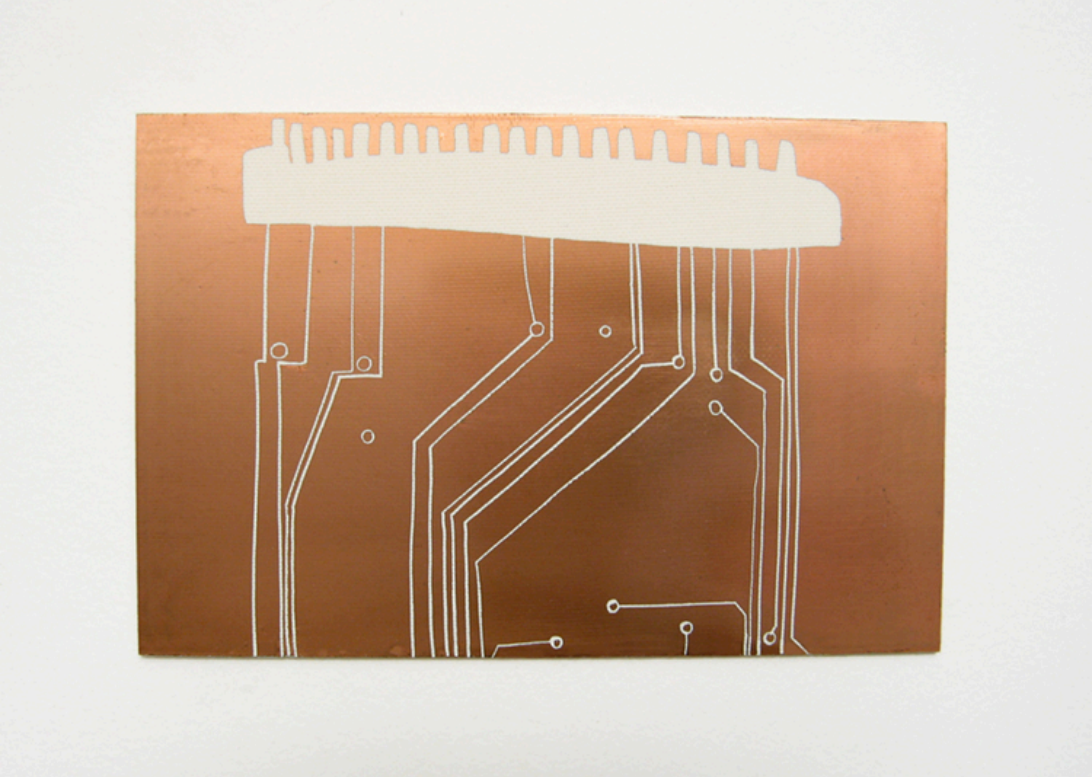

Figure 1 Thessia Machado, *Connectors*. Photo © Thessia Machado, used by permission.

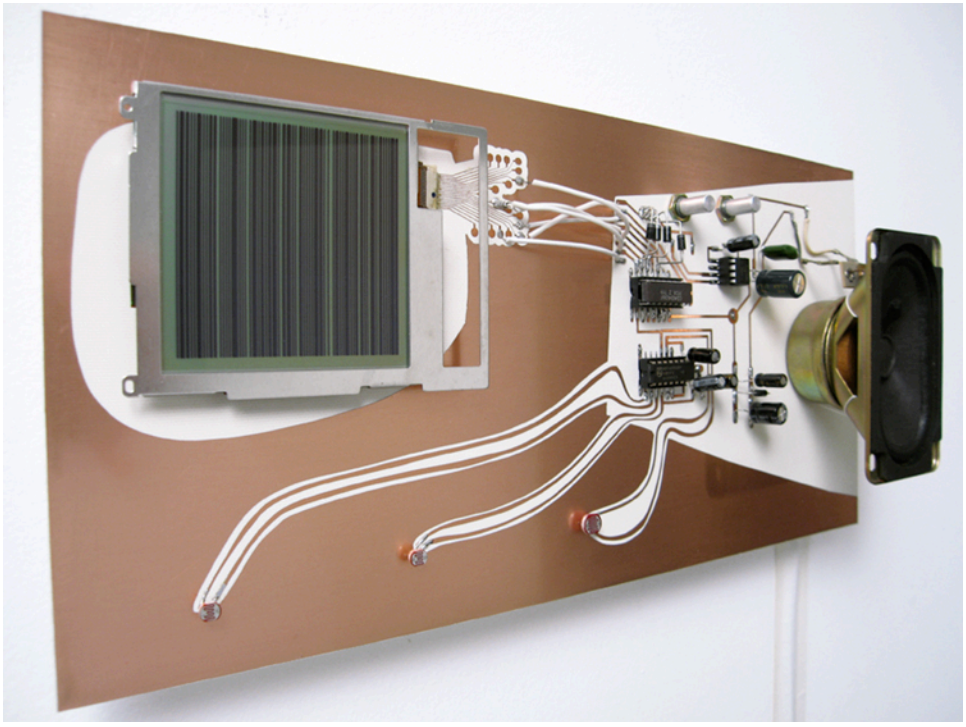

Figure 2 Thessia Machado, *Translux*. Photo © Thessia Machado, used by permission.

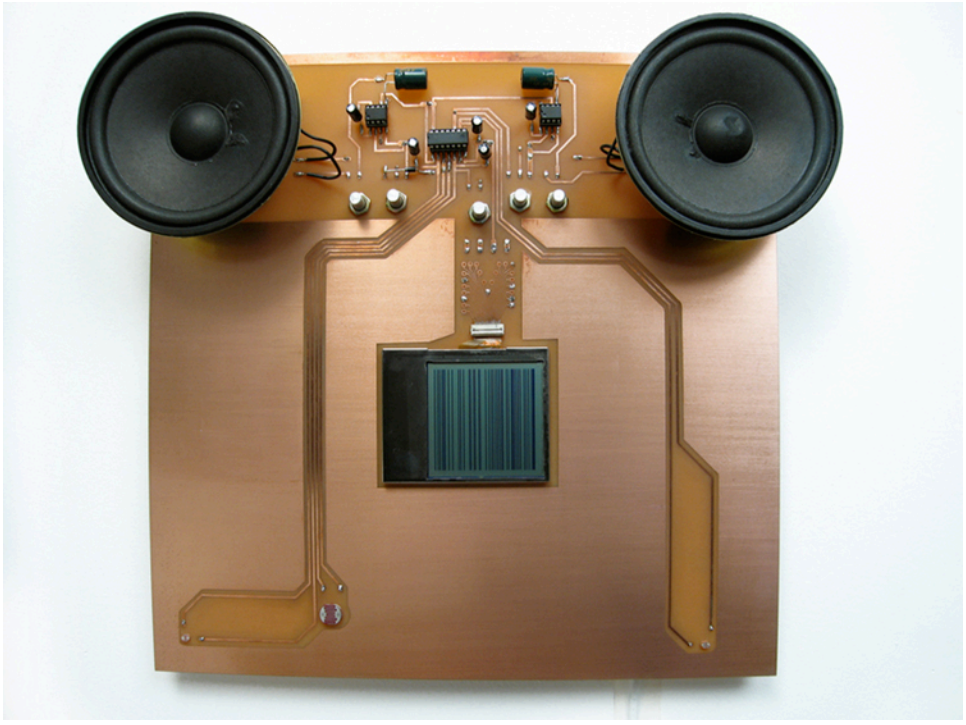

Figure 3 Thessia Machado, *Interference*. Photo © Thessia Machado, used by permission.

Over the years John Richard's Dirty Electronics project has centered on both designing instruments and developing an ensemble practice whose performers are drawn from workshops on building small synthesizers. It is a highly collaborative activity. One recent work, *Polytik* (figure 4), was designed by John Richards and Jack Featherstone in collaboration with other artists and engineers. *Polytik* is comprised of four modules, each of a different shape and color, and displaying a creative layout of components on the board. They resemble elegant fabric patterns, or a beautifully presented dish. Functionality is a priority, but so is the way design mediates or informs the decisions of the performer. Other projects Dirty Electronics projects include a collaboration with Chris Carter and a project based on William Morris' designs.

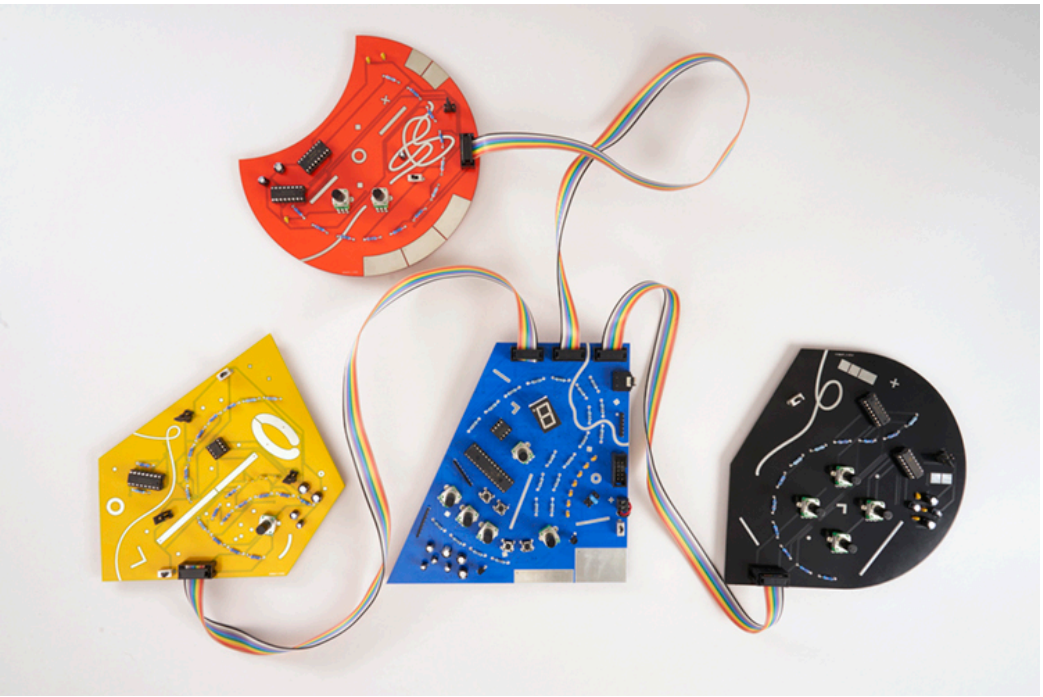

Figure 4 John Richards and Jack Featherstone, *Polytik*. Photo © John Richards and Jack Featherstone, used by permission.

Addie Wagenknecht's piece *Data and Dragons: Cloud Farming* (figure 5) is a good example of how the design of PCBs can reflect the ideas that are being explored in the creative work incorporating the instrument. Custom-designed boards are displayed in a form that resembles a 3d modeled cloud, and the resulting artwork addresses the perplexing nature of the internet cloud and the infrastructure that supports it. Wagenknecht is the director of Deep Lab, a cyberfeminist collaborative group focused on critically engaging digital culture, including matters of surveillance, hacking, anonymity, race and more.

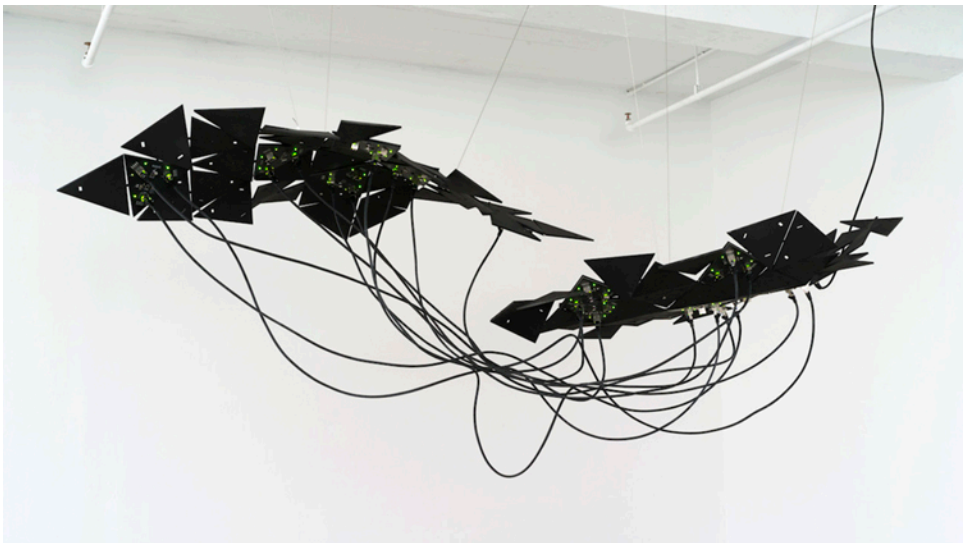

Figure 5 Addie Wagenknecht, *Data and Dragons: Cloud Farming*. Photo © Addie Wagenecht, used by permission.

Martin Howse is an artist based in London and Berlin whose work unfolds in the region of scientific research and technological experimentation. Howse calls his practice "micro-research", for which he has developed multiple instruments for which the creative aspect of PCB design is essential. Characteristic projects include *The Dark Interpreter* (figure 6), *Wormed Voice* and the *earthboot* USB device (figure 7). These instruments reveal the somewhat esoteric domain that serves as a substrate for Howse's practice.

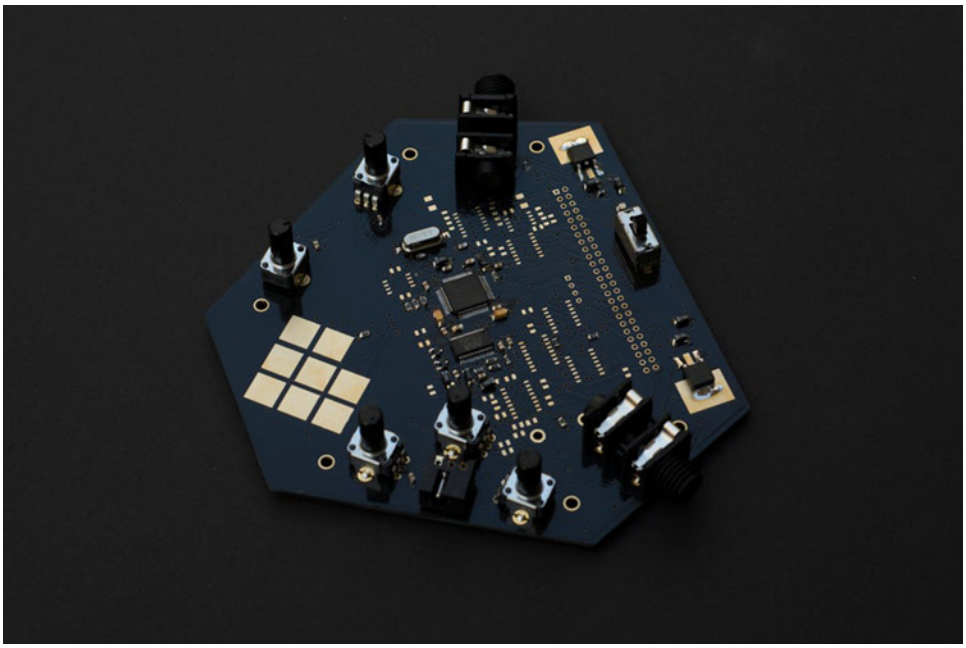

Figure 6 Martin Howse, *The Dark Intepreter*. Photo © Martin Howse, used by permission.

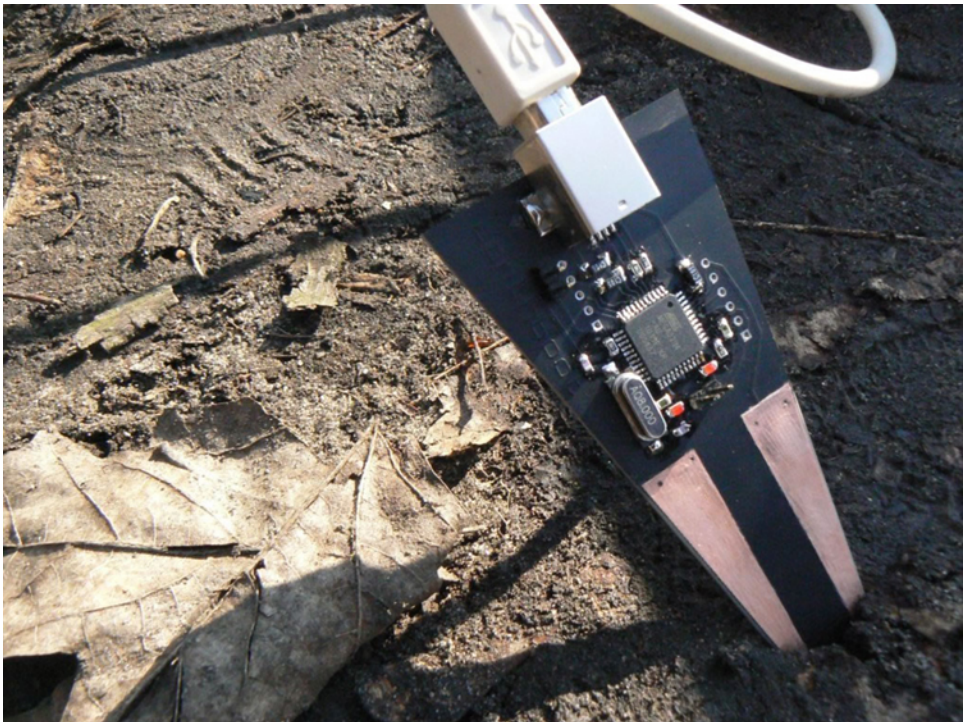

Figure 7 Martin Howse, *earthboot*. Photo © Martin Howse, used by permission.

How many times we have heard that a circuit board looks like a city? In *Tube Map Radio* (figure 8) Yuri Suzuki's use Harry Beck's London Tube map as the layout for a PCB, evoking Pynchon's character Oedipa's comparison the insides of a radio to the cityscape of San Francisco. *Tube Map Radio* takes two complex systems and mirrors them in a way that might clarify understanding of both.

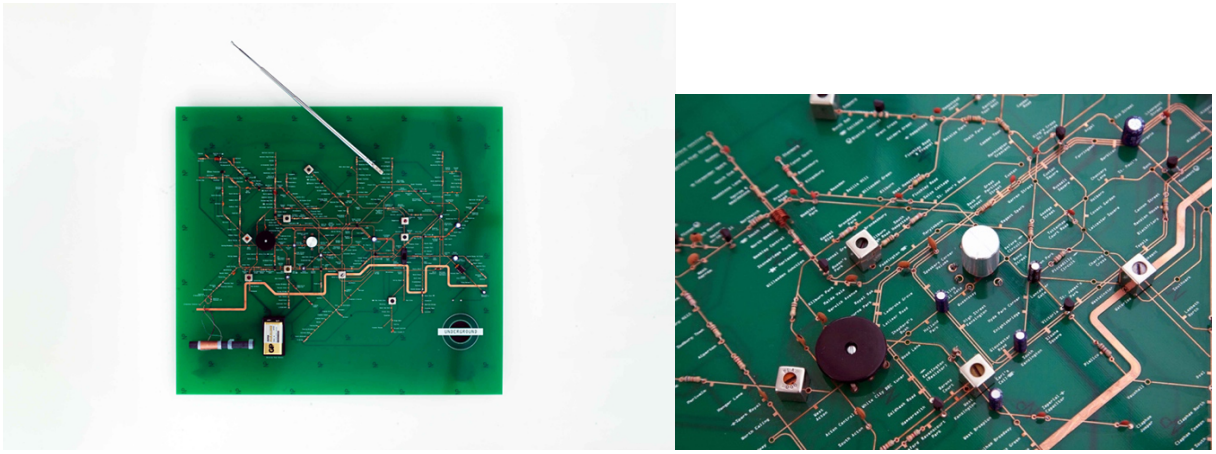

Figure 8 Yuri Suzuki, *Tube Map Radio*. Photo © Yuri Suzuki, used by permission.

Folktek, established in 2007, has designed some popular instruments such as *Mescaline* (figure 9). In their earlier work one can find pieces such as the *Electric Hands* (figure 10), in which two hands are etched into the playing surface of the instrument (evoking the legendary Cracklebox – see sidebar in chapter 12), and the *Time Machine* (figure 11) whose patchable surface features pads to which connections are made magnetically.

Figure 9 Folktek, *Mescaline*. Photo © Folktek, used by permission.

Figure 10 Folktek, *Electric Hands*. Photo © Folktek, used by permission.

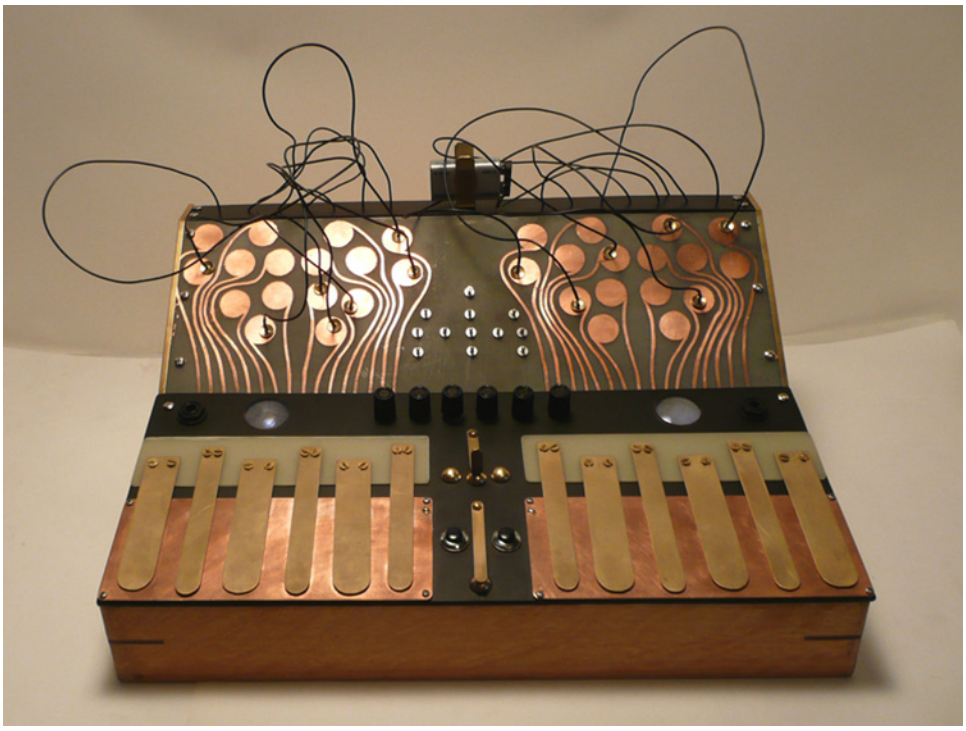

Figure 11 Folktek, *Time Machine*. Photo © Folktek, used by permission.

In the Netherlands Gijs Gieskes has designed some exotic boards, including one based on Futurama's Hypnotoad. Gieskes works mostly with circuit-bending, producing objects for both video and sound, but he is well-known as a chiptune artist. Notable is his series of boards named *Dirty Express* (figure 12), whose parts are arranged in a disturbingly arbitrary fashion, with traces, holes and outlines overlapping, and parts connected to nothing.

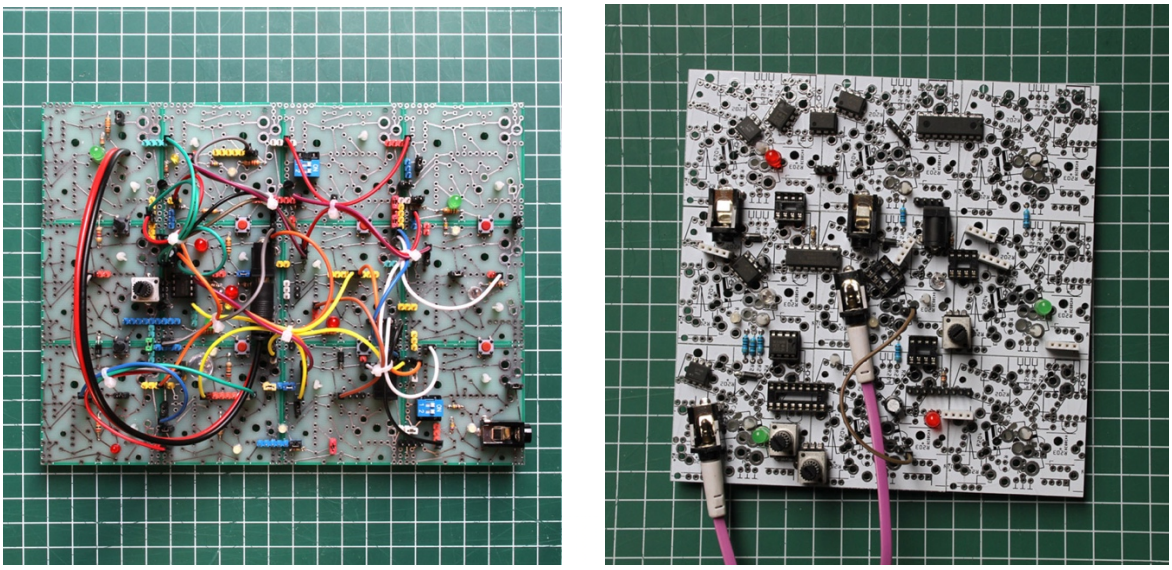

Figure 12 Gijs Gieskes, *Dirty Express*. Photo © Gijs Gieskes, used by permission.