Our feminist hacking contributions

The feminist hardware kit – Clay PCB

The feminist hardware kit demystifies high-tech electronics and encourages debates about sustainable technologies. It consists of electronic parts made from clay, thread, mud and other conductive, insolating and resistive widely accessible substances.

The current PCBs (printed circuit boards) in most electronic devices contain plastic, which is light and durable but toxic after decay. We tried to substitute plastic boards with clay boards retrieved from the forest around Vienna, which, after weathering, turn into clay. Clay is available ubiquitously and can be made durable by heating it to up to 750 degrees Celsius in a bonfire. After burning this ancient substance, it is still quite heavy, but it can be formed and manufactured without tools. The earliest civilisations, for example the Babylonians, applied clay tablets as their preferred medium for human knowledge transfer. For the feminist hardware kit, we applied clay tablets as a substitute for printed circuit boards (see Part 2 for a more detailed description of the Clay PCB project).

Patrícia J. Reis and Stefanie Wuschitz,
Clay PCB, 10x10 cm, natural clay fired in
wood fire, silver, electronics
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Gold is an important metal for hardware manufacturing because it does not corrode and it is highly conductive. We were researching the Indonesian Grasberg mine on Papua (the world's largest gold mine), which is owned by Freeport-McMoRan: '*US-based Freeport-McMoRan Copper & Gold holds a large stake in Freeport Indonesia. Freeport Indonesia was established as a new legal entity in 1991, replacing Freeport Indonesia Incorporated which had operated the Grasberg mine since 1967.*'[23] We did not

23 At this time, a *coup d'état* had enabled the New Order regime to destroy Indonesian democracy for more than thirty years: 'Freeport's seizure, control, and despoliation of Kamoro and Amungme lands and natural resources has circumscribed or destroyed local communities' economies and livelihoods, and caused the internal displacement -- often forcibly -- of entire villages.'

want to become complicit in this form of neo-colonialism (Hartami, 2023). The stealing of land and colonialism of pollution need to end (Liboiron, 2021), because they ruin the basis of all living.

For feminist hardware, we therefore explored the use of other metals and upcycled old china porcelain decorated with gold (see Part 2, Coffee Table project), using a technique known as lustreware.[24] It is applied to the clay tablet and burned with the clay to merge into one entity.

Patrícia J. Reis and Stefanie Wuschitz, in collaboration with Mz* Baltazar's Laboratory, Coffee Table 1, 2022
Photo © Gabriele Krisch

24 A metallic glaze composed of metallic oxides, namely gold, applied in a last firing at the melting temperature of the metal.

Minimum standards for feminist hardware

In this project we put together a set of rules that we intended to follow. A set of rules that worked almost like an algorithm, which limited, but simultaneously facilitated, our creative process:

FEMINIST HARDWARE IS DEVELOPED:

- Without mining in harmful ways
- In an environmentally friendly way
- Under fair working conditions
- Manufactured from ubiquitously available materials
- Without generating e-waste

This set of rules served as a starting point to explore practices of resistance against current forms of exploitation and extraction for hardware production. The experiments conducted on alternative assemblages for future technologies instigated debates on fair-traded, ethical, biodegradable hardware for environmental justice. In this sense, building circuits that use ancient community-centred crafts as an artistic practice encourages colonial thinking to be unlearnt, market forces to be disobeyed, and future technologies for the Chthulucene to be imagined.

Using fairly traded, recycled or existing materials only, we intended to answer our research question: *What is feminist hardware?* Forcing ourselves to comply with our own rules generated a range of experiments, trial-and-error attempts, frustrations, hacks and narratives that eventually evolved into new artworks. In the following chapters, we will describe these new artworks: Salon of Open Secrets — a feminist online hacklab; Acupuncture sonification; Low-tech Paper Pulp Lab; the Coffee Table; Who has land to make a fire?; the mud battery workshop; Clay PCB; the Salon of Open Secrets citizen science project; and our main research output, the Ethical Hardware Kit.

During our arts-based research, we learned about the principles of de-growth and educated ourselves about our complicity in toxic global commodity chains. Decolonising hardware means making sharing your priority (Tungstall, 2023, p. 69). So, we initiated several platforms to put our approach up for debate, for example at the Feminist Hardware Festival, the Salon of Open Secrets or other conferences that we took part in (e.g. POM 2022, RIXC Art Science Festival 2022, re:publica 2022, Schmiede 2022). We shared our concepts in the form of articles, manuals and tutorials.

Patrícia J. Reis, Stefanie Wuschitz and
Anna Watzinger, Conference at
Schmiede, Hallein, Austria, 2022
Photo © Gabriele Krisch

These rules or standards for feminist hardware constitute a boycott of hardware that relies on extraction, exploitation and colonisation. And they enable a playful, speculative and hopeful approach towards alternative solutions.

As media artists, we usually work with hardware such as computers and other electrical devices. To decolonise our practice, we had to go beyond demystifying the black box of this hardware, as feminist hacking implies, and dive deeper into understanding the basic elements of these circuits and chips. This journey took us (virtually) to many places, from gold mines in Indonesia to upcycling workshops in Cuba and e-waste landfills in Ghana. The interviews with international experts that we encountered are printed in shortened form in Part 3. These interviews represent a small selection of the wide range of interviews conducted during the entire research period.