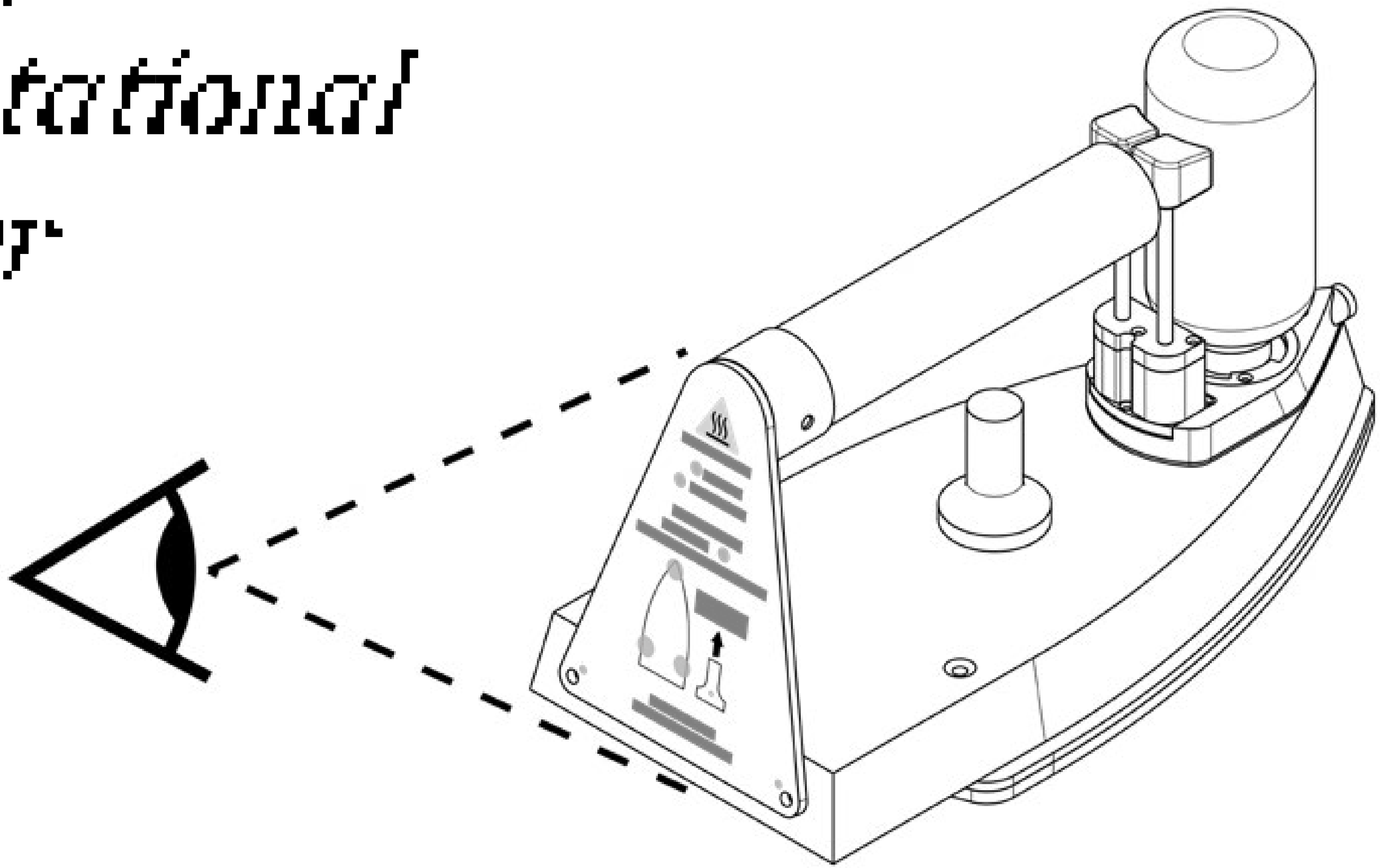
Oscar
Oweson

Product/

Computational

Designer



portfolio 2024

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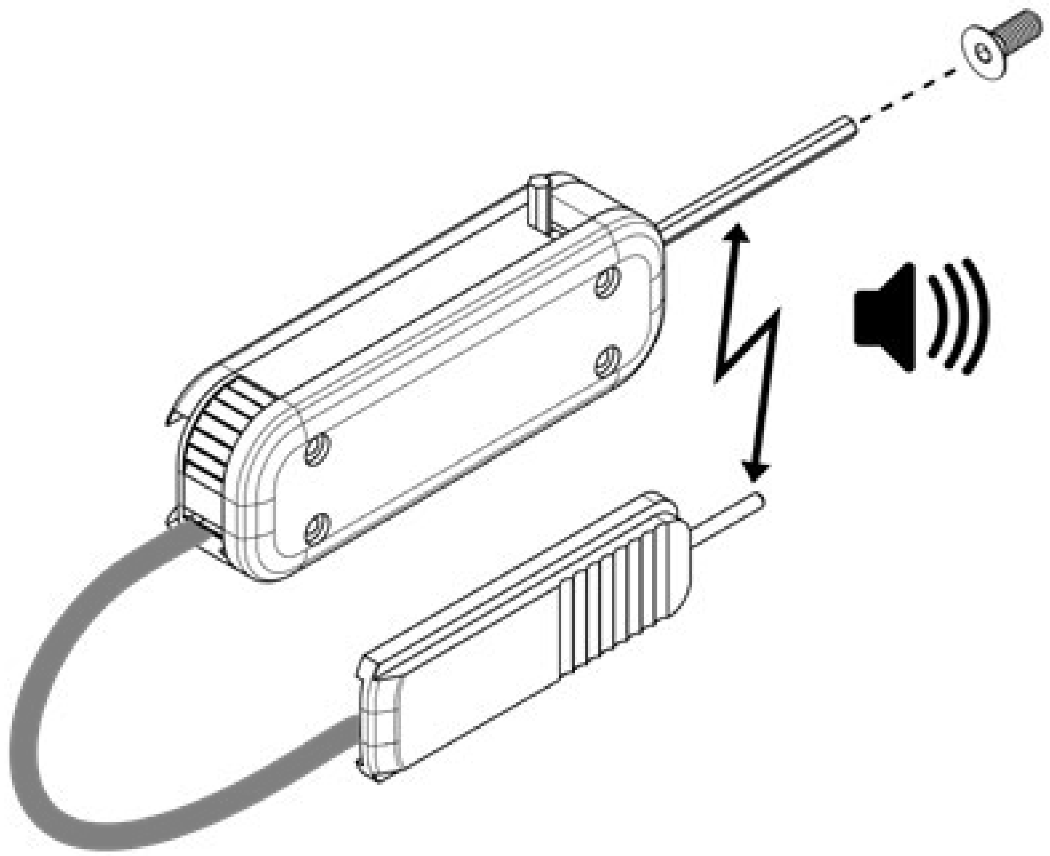
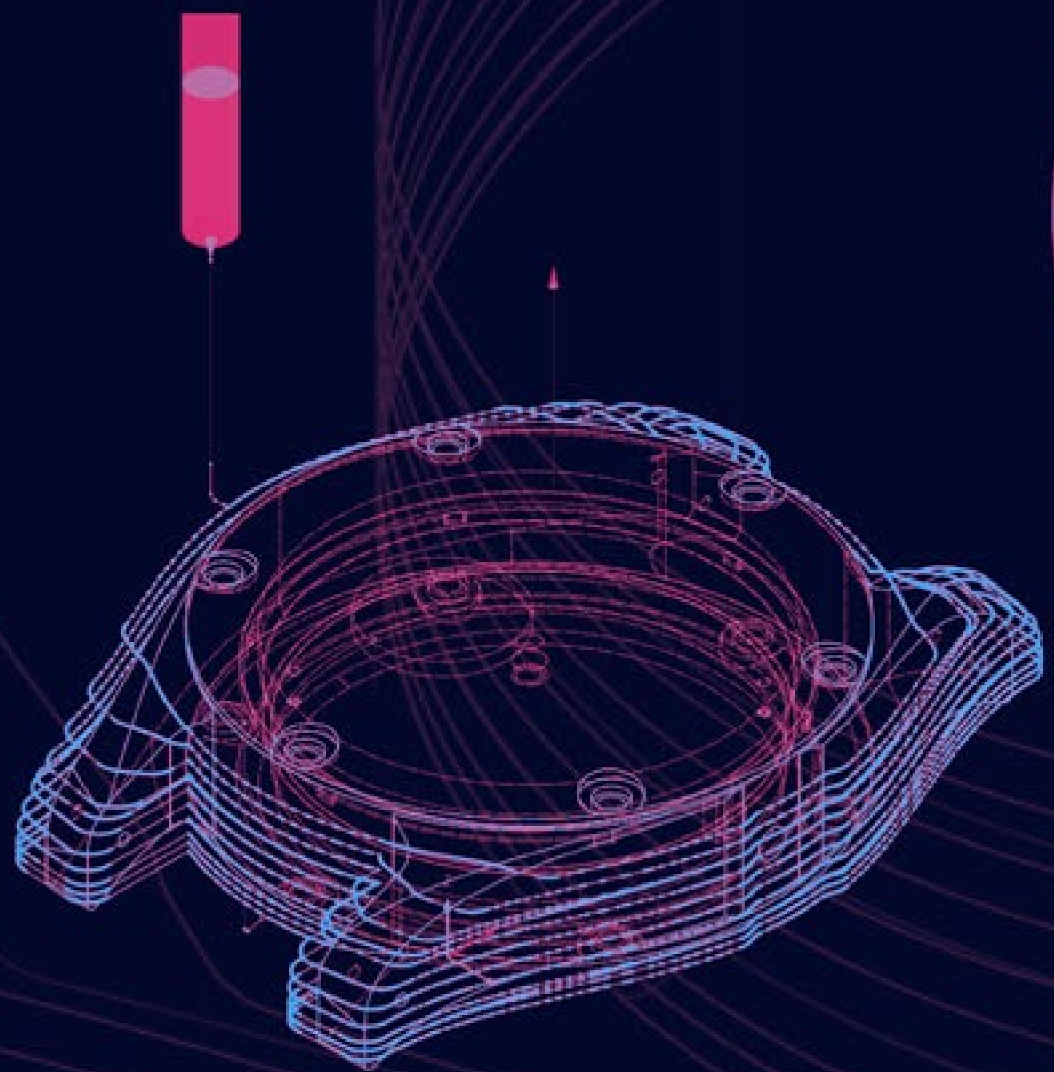


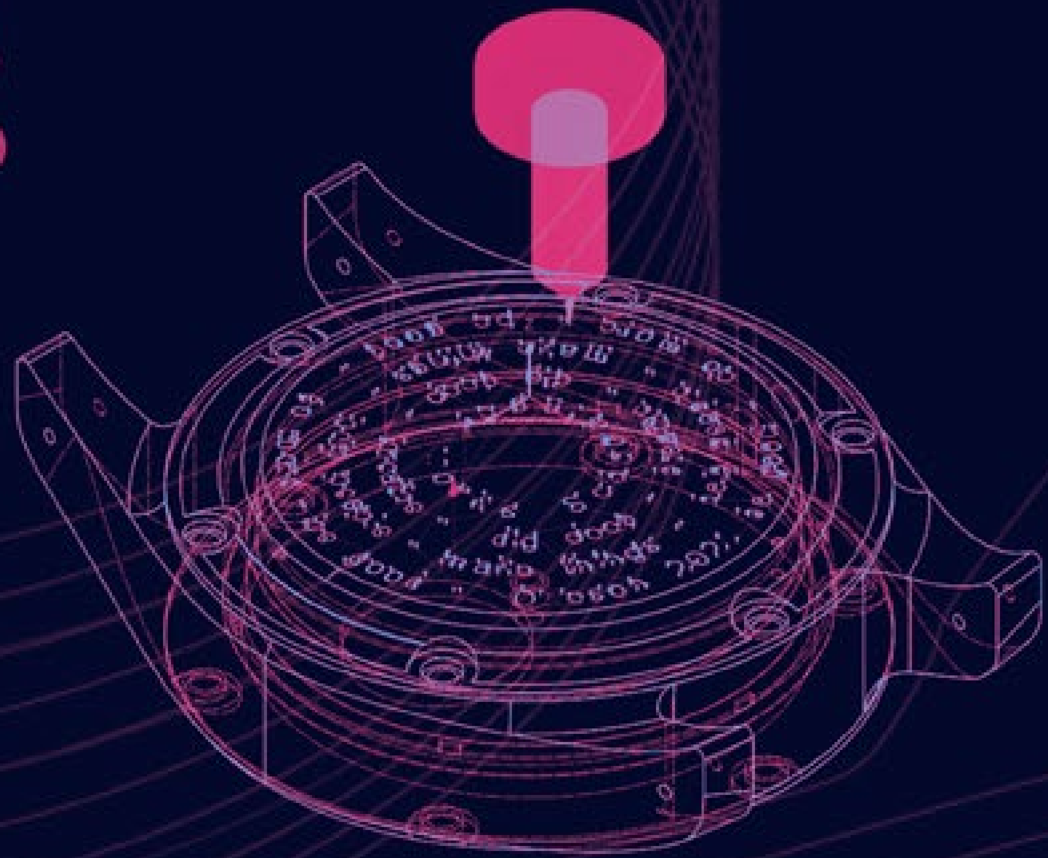
/ fruther projects available on my website
www.oweson.xyz

Wrist Watch

Exploration of Tools, Trades & Technologies.

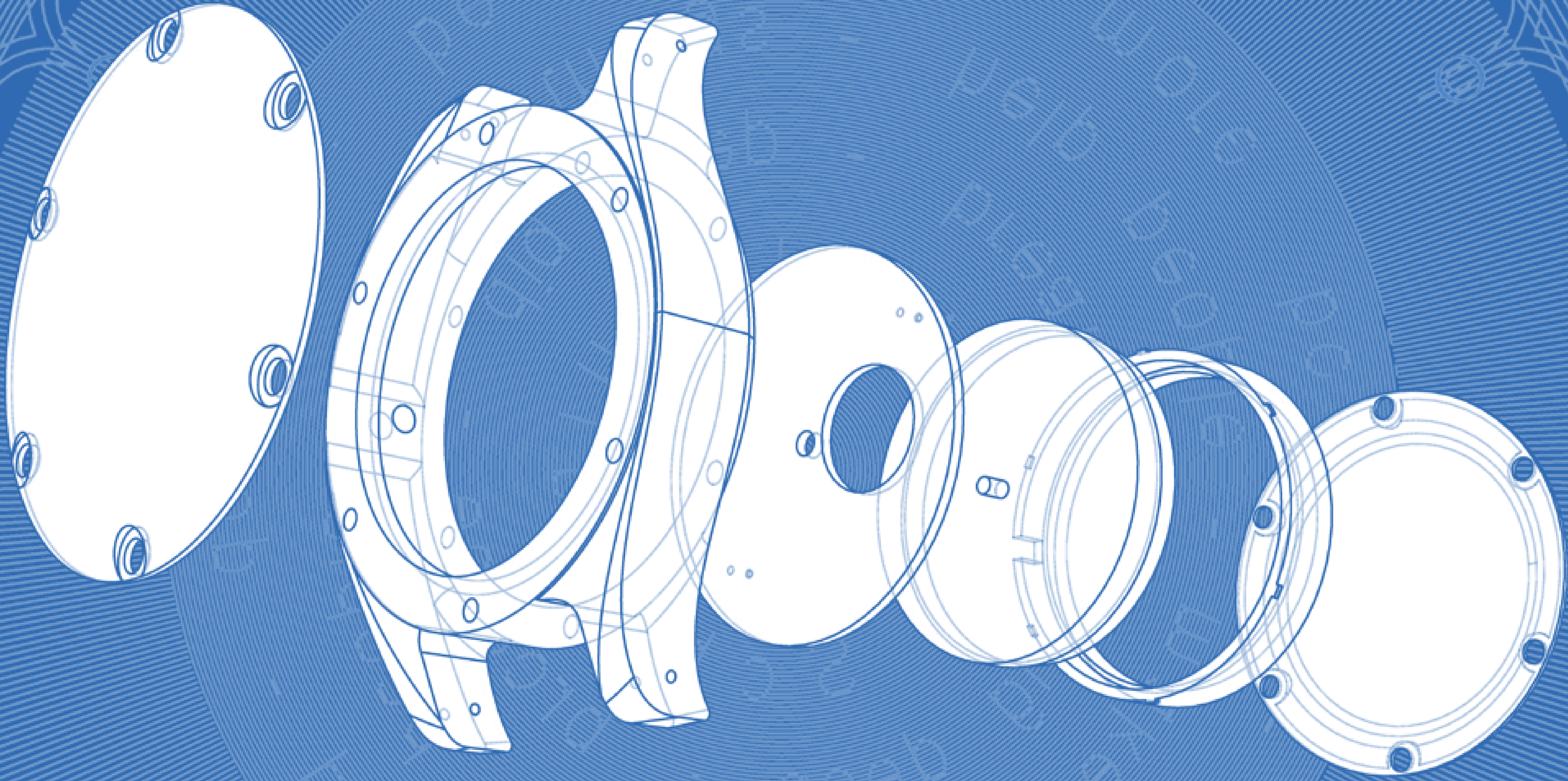
During the summer of 2021 I found out that watch movements were a lot more affordable than I had previously imagined. As a fun project to exercise my surface modeling, algorithmic modeling, and CNC machining skill I decided to make a watch for myself. CAD CAM was done in Fusion & Grasshopper, milled on the Carbide3D Nomad 3.





Assembly

The wrist watch was built around a Seiko NH38A movement, with 5 components, all made out of clear acrylic, which I sanded to 7000 Grit and then polished. The assembly uses m2 screws or friction fits to fasten all the components.



The modeling and planning was done over the span of a couple of weekends, The most challenging aspect was sourcing stock parts and learning watch terminology and conventions, as to not make any mistakes in my design that would render it incompatible with existing parts.

CAM & Machining

All of the parts of the wrist watch were made in a total of 49 Operations through 10 different setups. The watch required machining on three of its sides, as such, custom jigs were made to hold the parts and maintain correct positioning throughout machining.

Dial & Algorithmic Modeling

The watch dial was made using Rhino and Grasshopper. I wrote a simple script which varies the displacement depth of the centers of a voronoi pattern. This depth is determined by a black and white image, in this case a circular gradient that would fade the pattern to allow for numbers to be engraved at the edge.

repairware

Final Year University Project

Brief

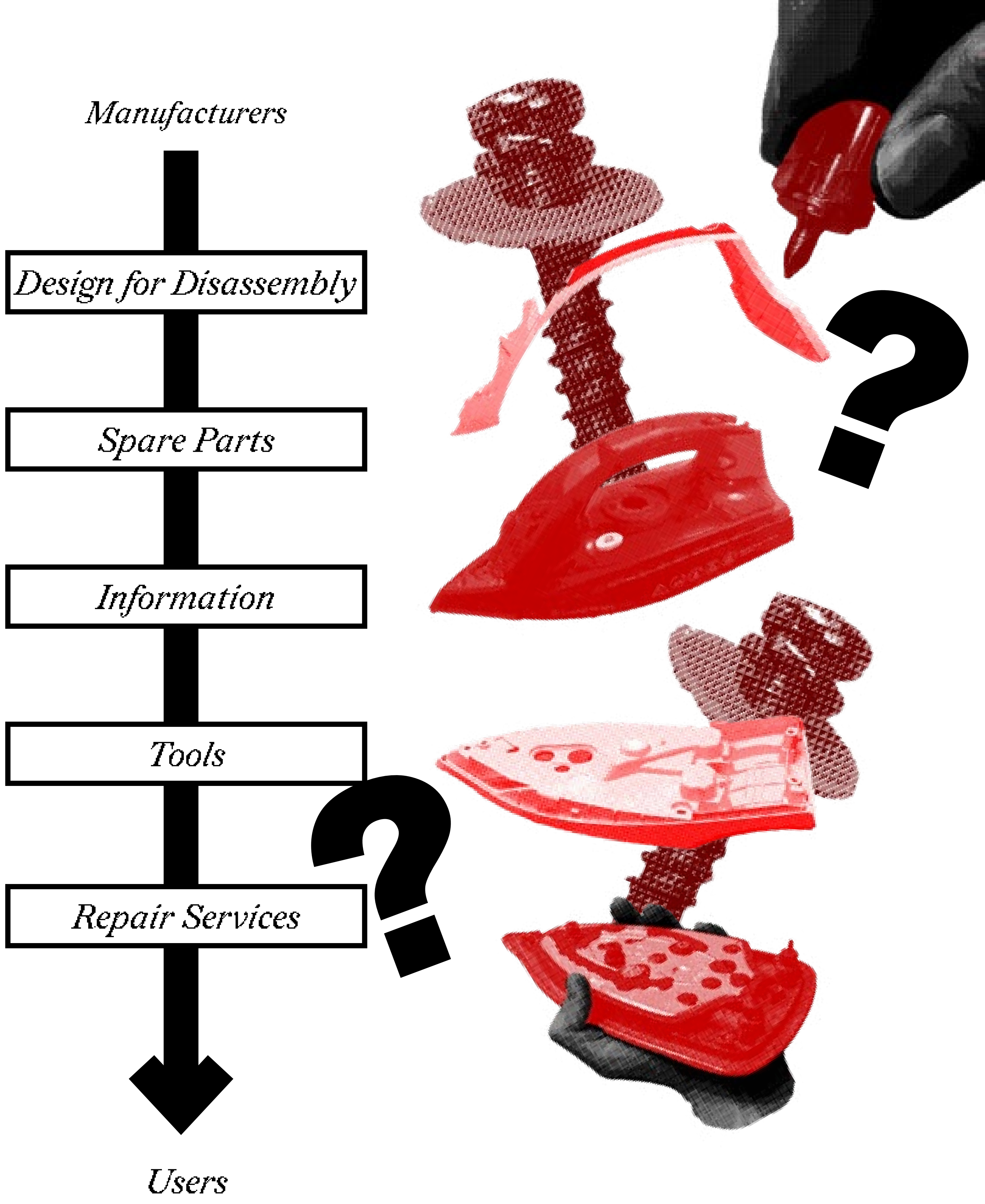
Small home appliances are seen and designed as disposable items. They break often, and are thrown away. This is a waste of natural resources, and accounts for at least 200 million metric tons of waste each year in the European market alone [1]

These appliances are fundamentally simple devices, that anyone can learn to fix. However they are intentionally designed to be difficult or impossible to disassemble and reassemble. By designing with disassembly, maintenance and repair as a priority, we could reduce our waste, and increase the emotional bond we have with our things [2]

With the increased interest from consumers to have the right to repair, there is an opportunity to question the unstated ideology in the current methods we design and manufacture our appliances. Spare parts should be easy to access, and pieces should be remanufacturable locally, without the need for complex processes or machinery.

A range of three different appliances were selected, a kettle and iron and an electric grill. These appliances were chosen for their similarity in construction and broad use across Europe. A repair tool was also developed in conjunction with the appliances, the tool would allow for the user to fix their appliance if it were to break.

[1] Mintel (2020) Executive Summary Small Domestic Appliances.
[2] Chapman, J. (2021) Meaningful Stuff, Design that Lasts, The MIT Press.



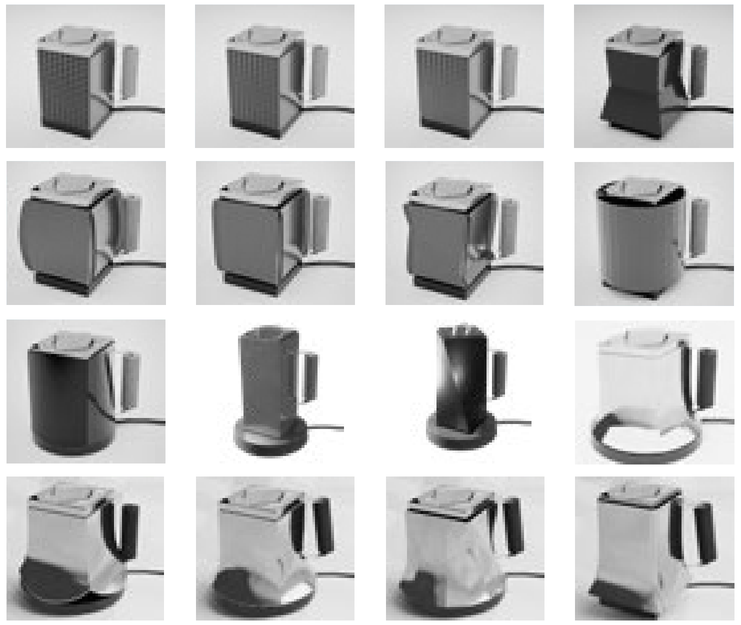
Issues : *use of thread forming screws, hidden screws, safety screws. Glued on, uncleanable soleplate. Water tank inaccessible for cleaning. Steam channels inaccessible for cleaning. Hard to fill the water tank. Multiple types of plastic inseparably joined. Consumable components (fuse) spot welded in.*

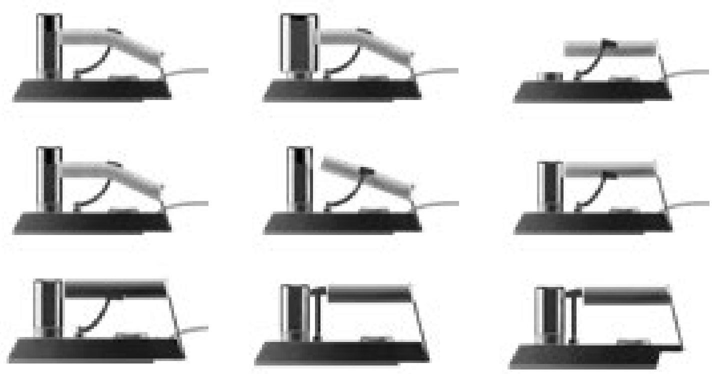
No instructions available, No spare parts available.

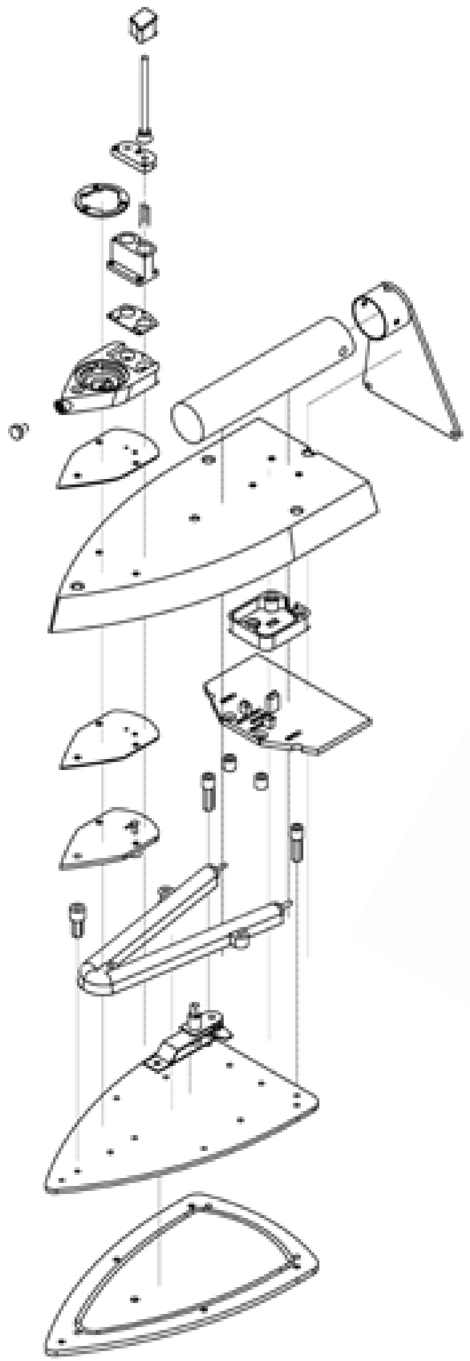
Impossible to repair for average user

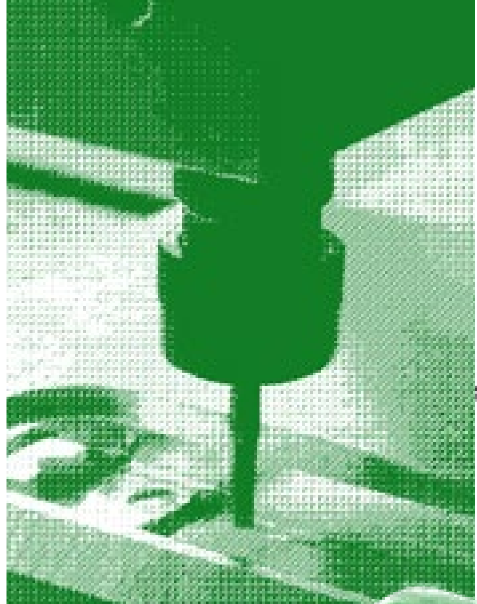
Development

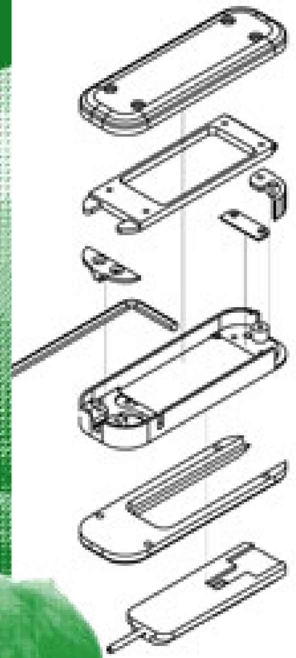
The three selected appliances and tool were developed, focusing on manufacturability at any scale, to allow for spare parts to be made locally without the need for mass production. Due to the scope of the project, only the steam iron and tool were taken forward for further development and prototyping.

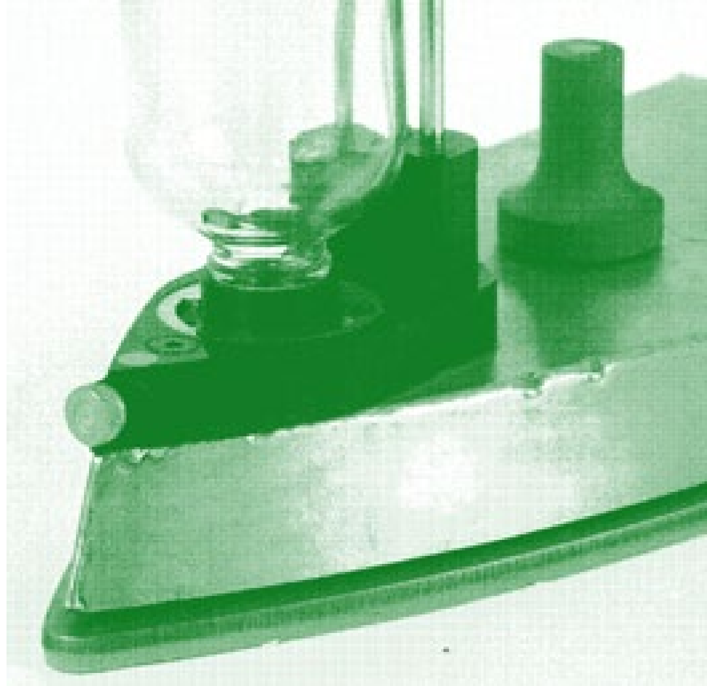


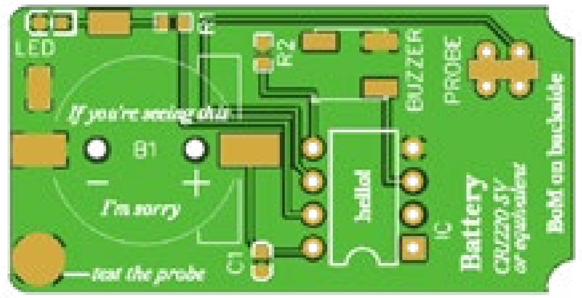


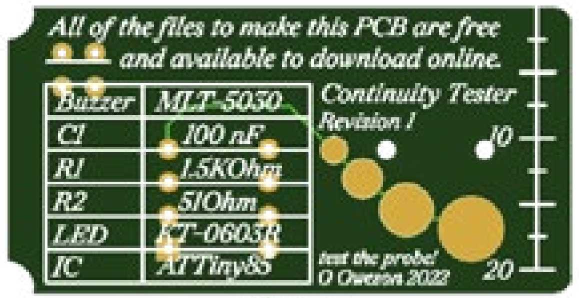


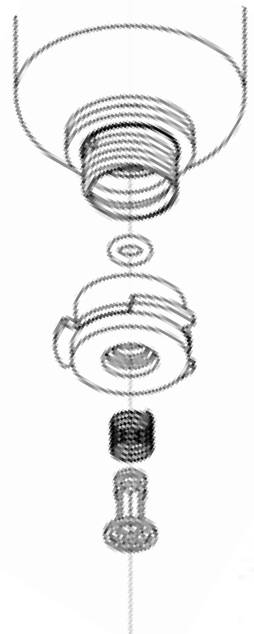


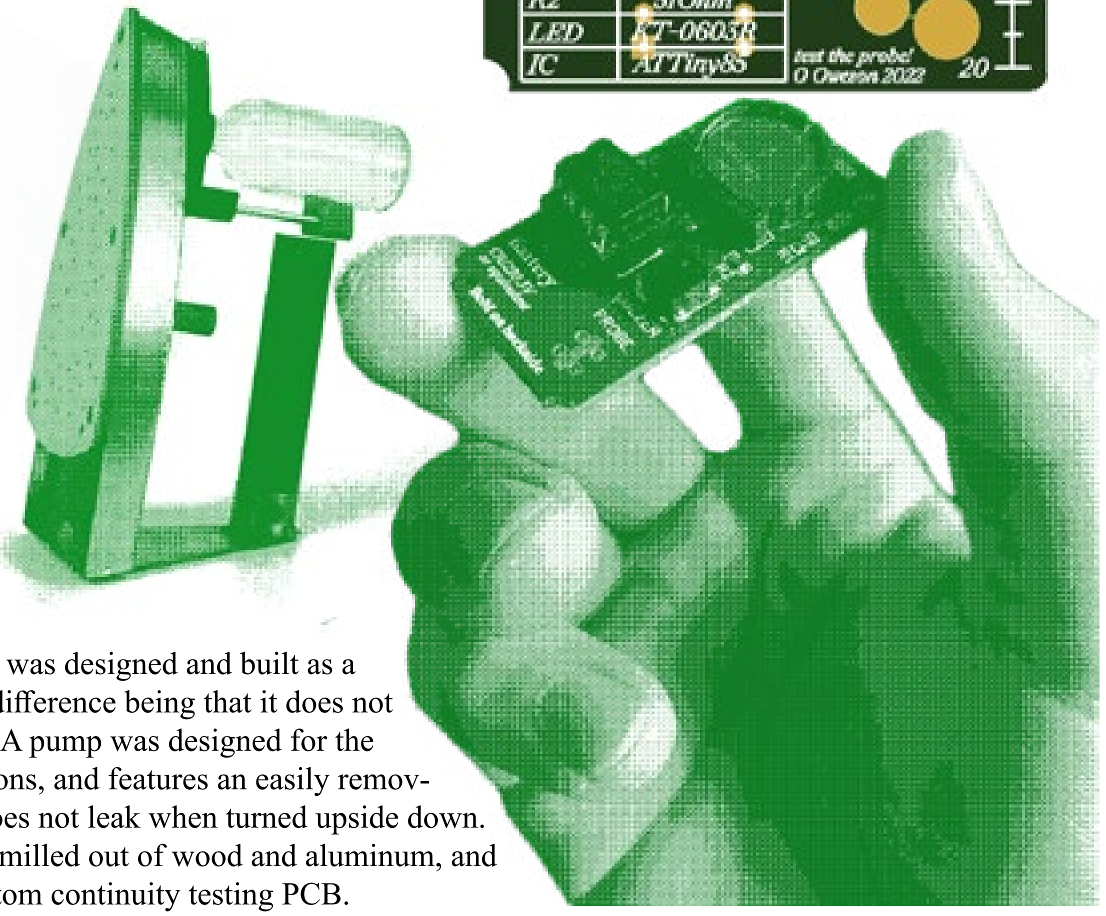










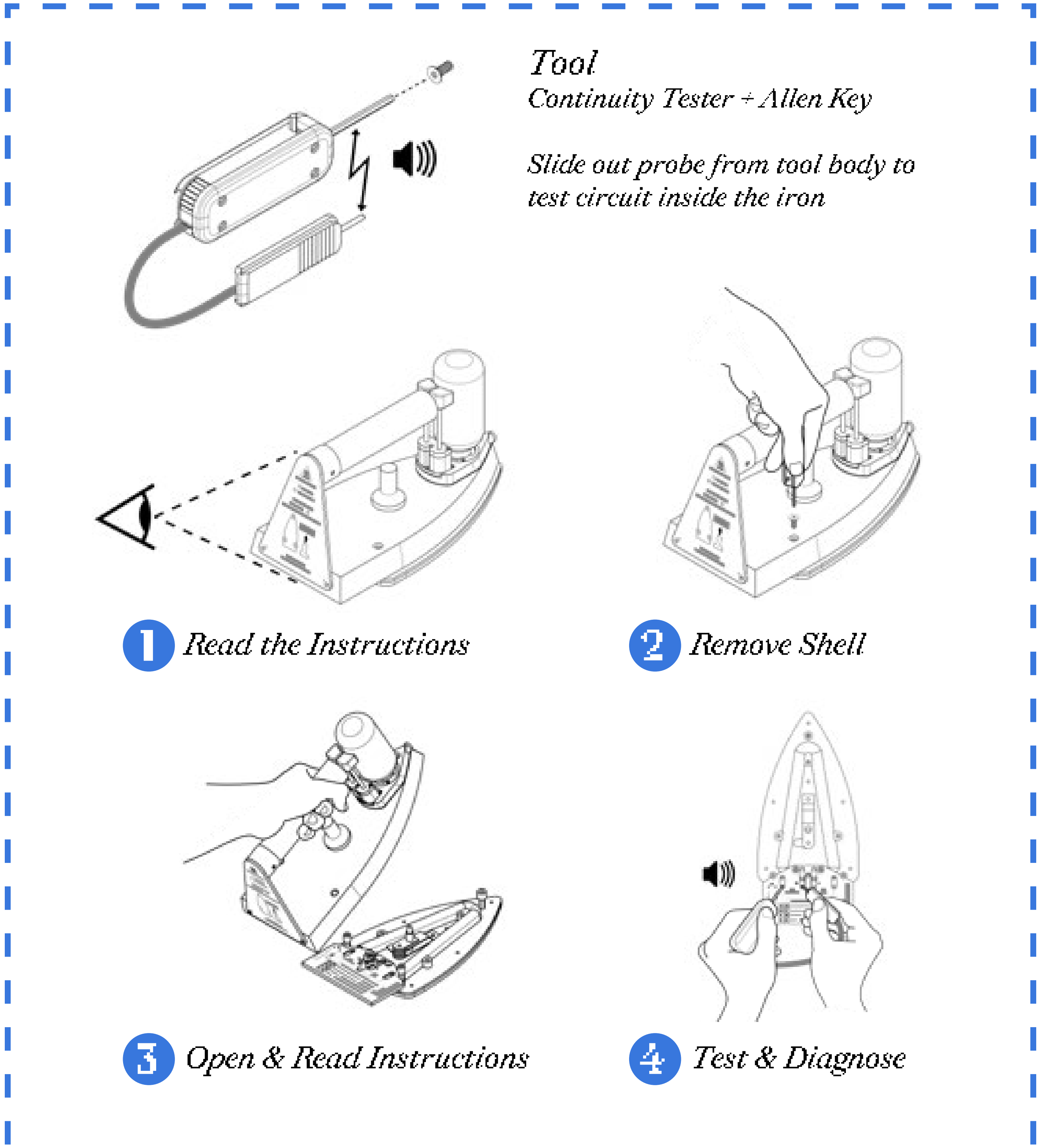


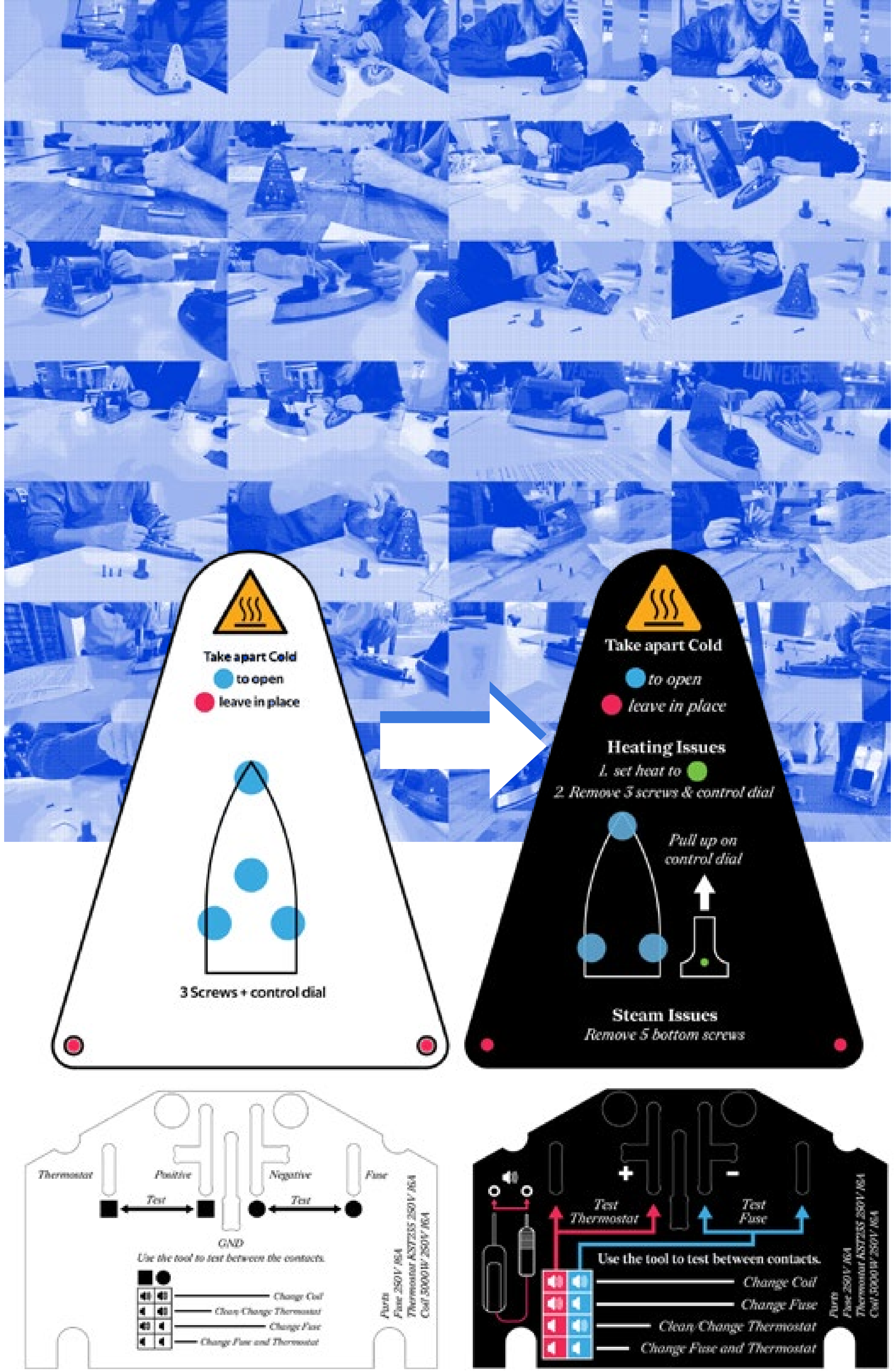
A prototype steam iron was designed and built as a proof of concept. The difference being that it does not feature a working coil. A pump was designed for the spray and steam functions, and features an easily removable water tank, that does not leak when turned upside down. The tool was built and milled out of wood and aluminum, and features a working custom continuity testing PCB.

Testing

User testing was carried out on the prototype, with the goal of testing the intelligibility of the labeling and intuitiveness of the disassembly. The users were asked to disassemble the iron following the printed instructions on the labels.

No participant failed the exercise, and results were overall positive, but with clear areas for improvement of the diagrams. Particularly in the internal diagram, where some users were confused by the exercise. These areas were revised with the feedback received. Other areas of further improvement include improving the handle bracing, as well as increasing the volume of the continuity tester in the tool.





Final Proposal

All standard M4 hex screws. No use of glue. Disassemblable, cleanable soleplate. Removable easy to fill water tank. Minimal use of plastic. Consumable components (fuse) replaceable.

Instructions on the device.
Standard components, replaceable and serviceable

Possible to repair for average user


take apart if
steam is not
working
descale with
appropriate product
O.Oweson 2022

pininfarina

3 DAY WORKSHOP - AUTOMOTIVE DESIGN

After Having finished the DesignMorphine Masters, we were asked to go to pininfarina to do a 3 day workshop, to showcase the possibilities of computational design and the skillset we had gained throug the masters. Together with Clark Cheng and Ryan Leung we were put on the automotive team, a great challenge, considering the history long and prestigious history of pininfarina in that field. The brief consisted of designing a vehicle to fit in the urban context, with an emphasis on exuberhant luxury and classic elegance.

Ideation

Looking at Pininfarina's history we broadly outlined two eras in the company's automotive design. The first, one of classical design, with more rounded and soft shapes, that defined the sports cars of the postwar era. The second, the newer, more technological and hypercar oriented design, with sharp shapes and aggresive profiles. For our brief we decided to try and emulate some of the older, smoother designs, and update them to a modern silhouette.

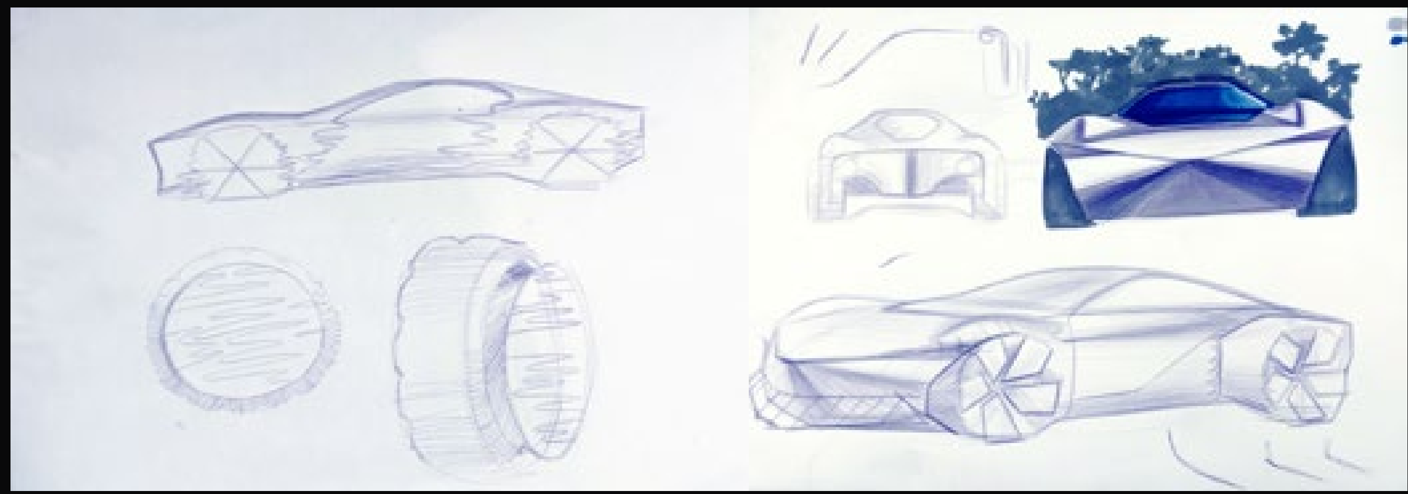
classic

fast - elegant - refined - luxurious

modern

Day 2

We finished day one with a rough model based on the design of the Ferrari 250 GT designed by Pininfarina, we then got to discuss with an autmotive designer from Pininfarina who suggested some changes, to make the car more modern, while still keeping influences from the old styling, to avoid a retro design.



sketches by Pininfarina automotive designer Dmitrii Kuznetsov

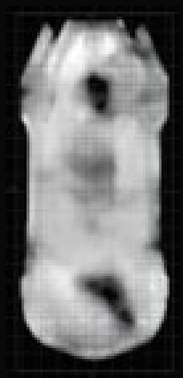
250GT

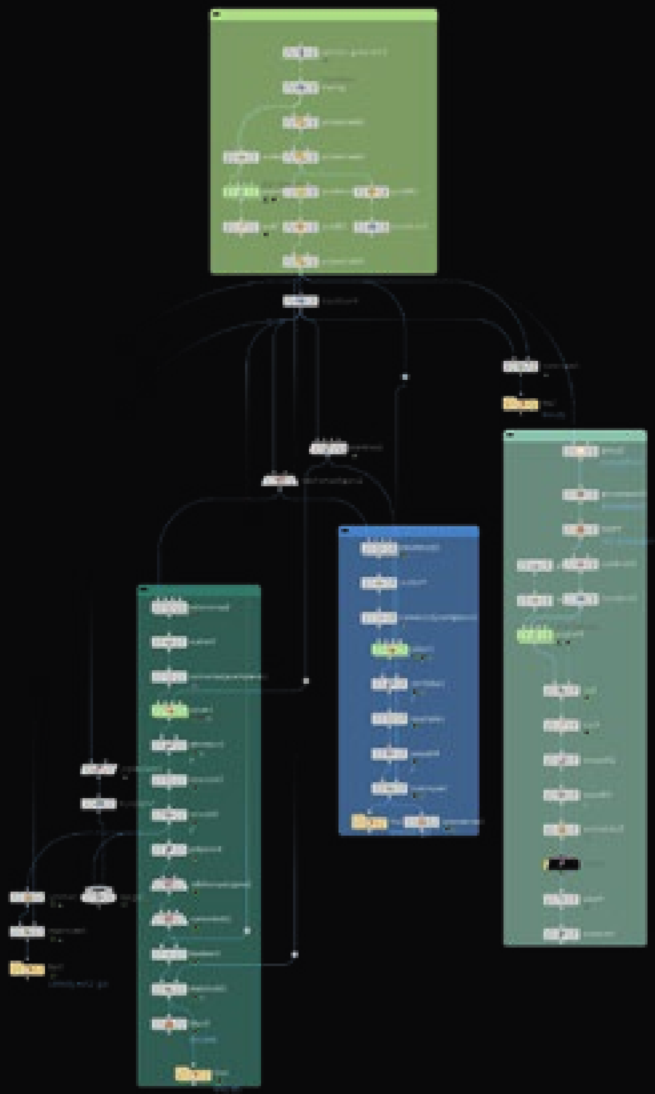
intial concept

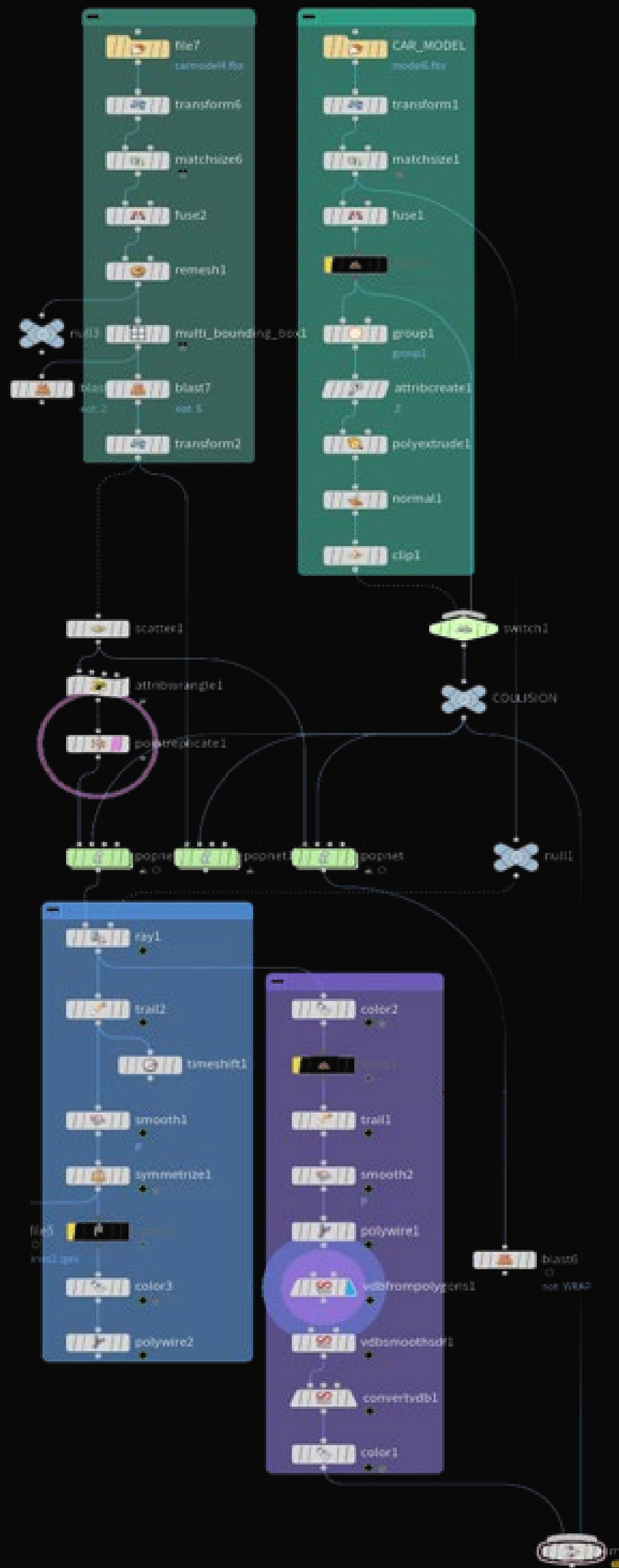
revised concept

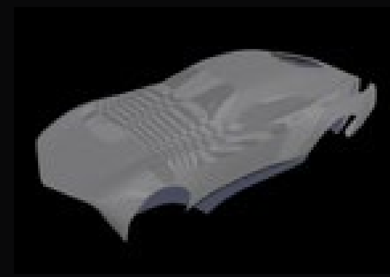
Computational Design

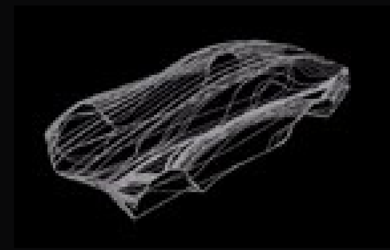
We also found that a throughline for pininfarina's entire history was one of aerodynamics research and testing. They were pioneers in the field and it continues to drive a lot of their design work. The team thought there could be an interesting opportunity to try and showcase the aerodynamic trails on the design of the car, to attempt to convey all of the work done by the engineers to customers, visually. To achieve this the team devised two HoudiniFX workflows, one for turbulent air, and one for laminar air.

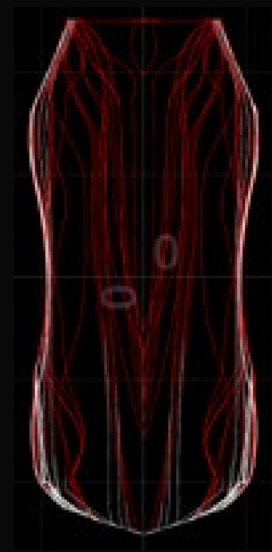










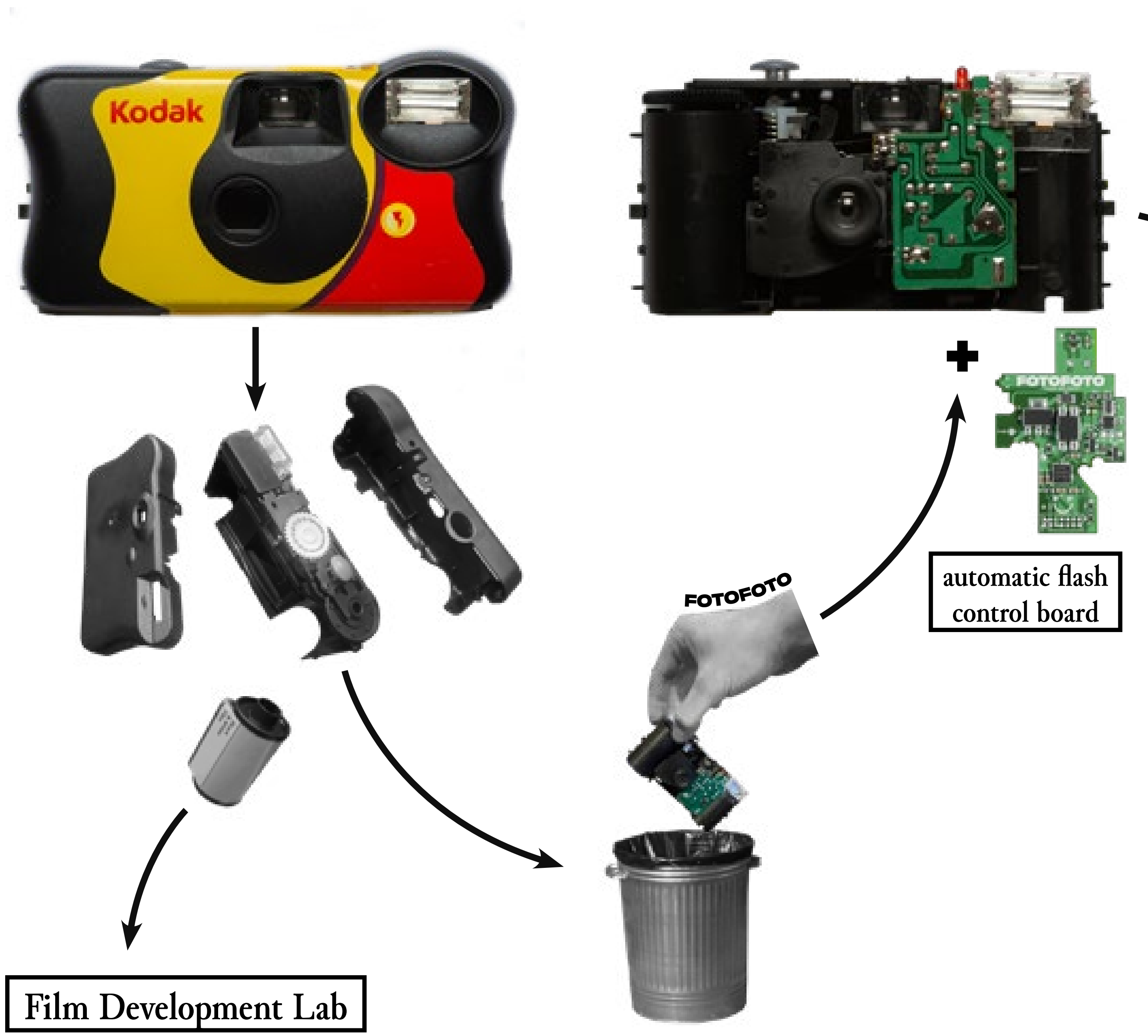



pininfarina

FOTOFOTO

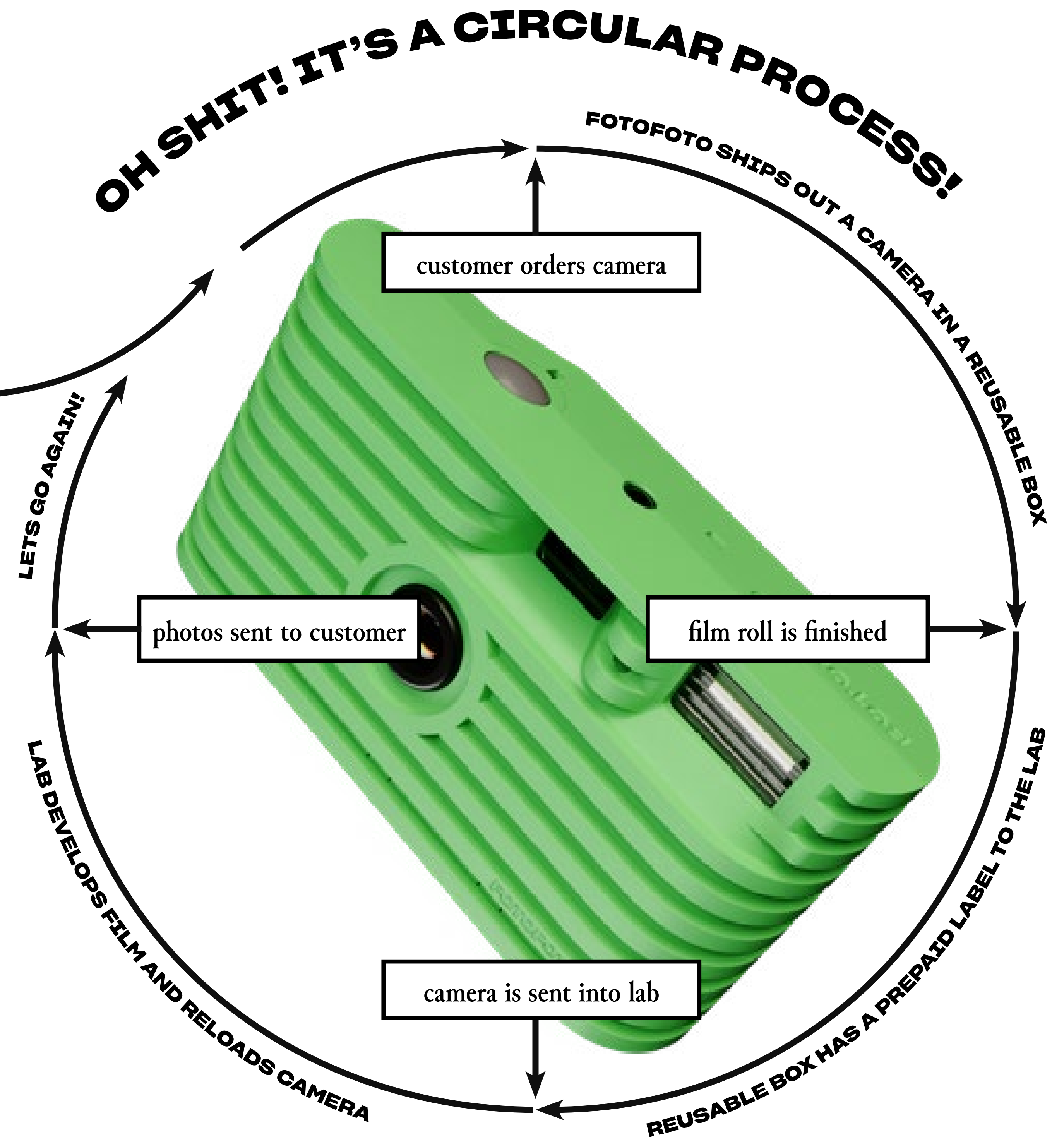
Fixing the disposable camera

In September 2022 I was approached to lead the development of a new film camera to rethink the disposable camera market, and turn it into a service based buisness. Disposable cameras are, as the name implies cameras that are designed as single use objects, and are in the best case scenario, recycled after use, or go to landfill. This is evidently an outdated, unsustainable practice, that can easily be improved.



Originally, the brief given was to create an entirely new camera for this new service. Doing this would have been a costly and lengthy process, to speed up development and with sustainability in mind, I proposed to instead make use of the wealth of used single-use cameras that are being shipped to recycling or landfill every year, and upgrade them to make them better and reusable. This proposal was accepted and work started in reverse engineering existing disposable cameras and seeing how much could be reused

It turns out, most cameras that are destined for recycling or landfill, can be reused many times over. Even the battery is usually still at around 90% capacity. The shells however can't be, and furthermore, we identified that the major useability issue with disposables was the flash, mainly due to user error, as people would forget to turn it on, so we opted to make an additional board that would automate it and turn it on when necessary.

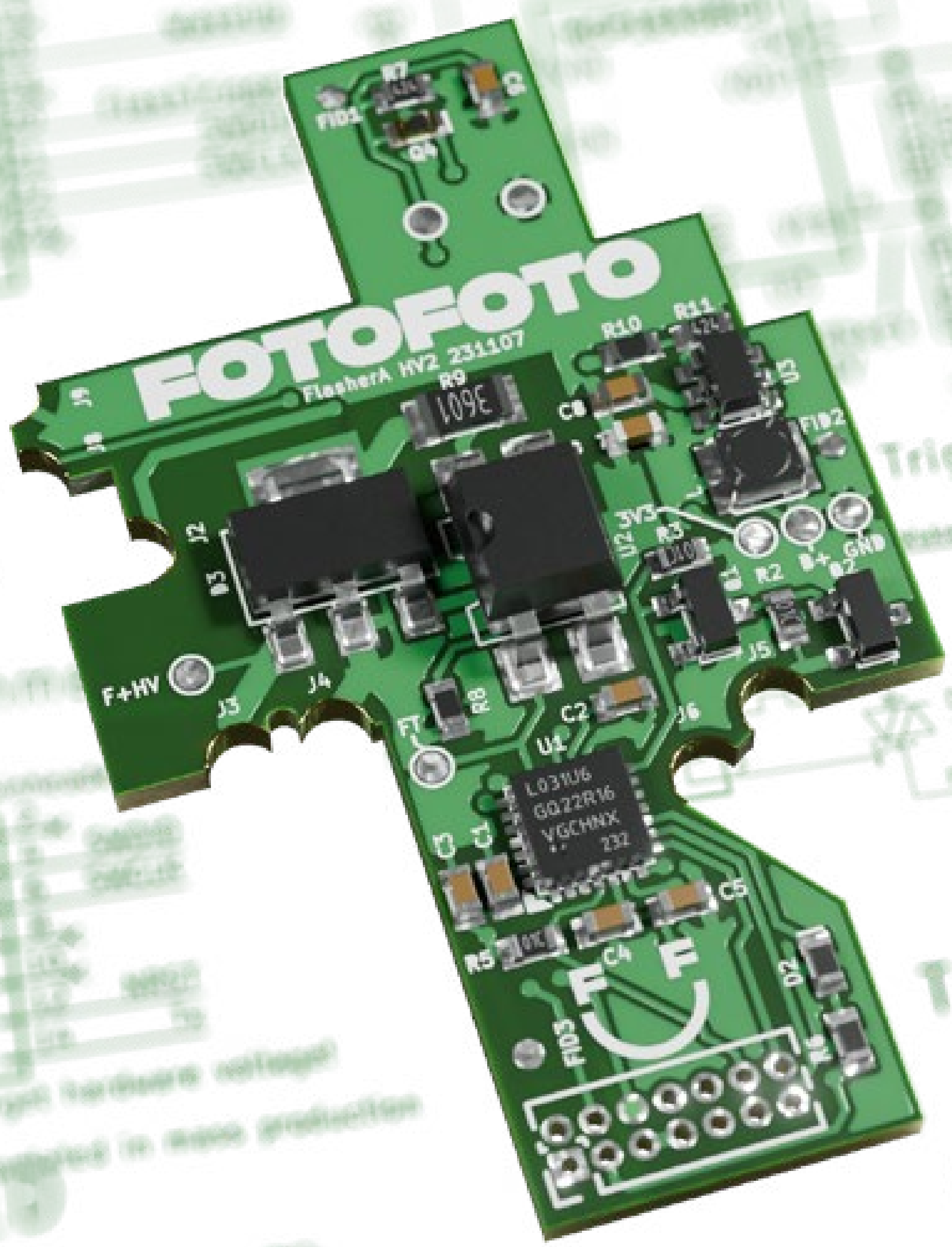


Issues : Cameras are designed to be disposed of, shell is intentionally ment to break on film unloading.
Flash is often not used when it should be as people misjudge lighting conditions

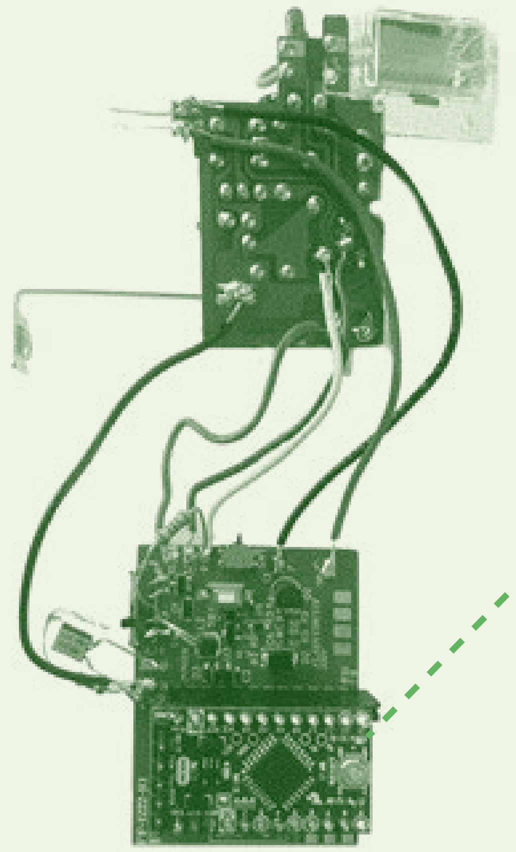
Solutions : make a new, reusable shell, that doesn't break during disassembly.
make an additional PCB that automates flash functionality.

Electronics Design

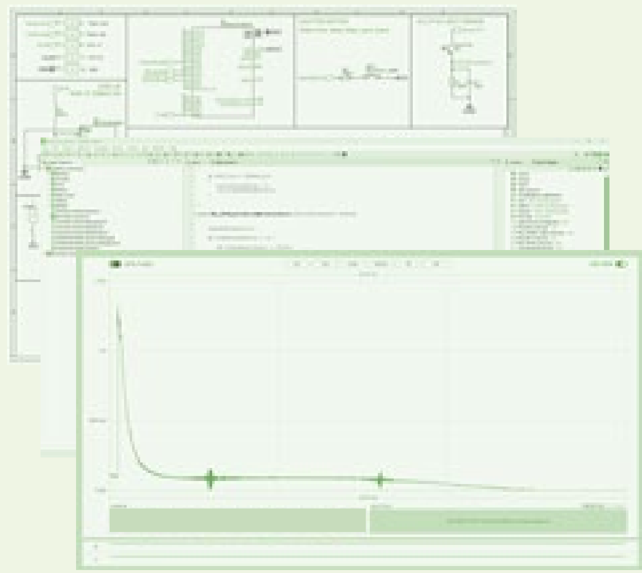
The project contained a major electronics design component. I designed and built the first minimum viable protoype to work with an arduino based system. It however became clear that the final product would need to be more power and cost efficient, I then oversaw the transition and improvement of this design by external partners to achieve a design that would fit that target. We ended up switching to the STM32 platform, as it was the most promising for both power and cost.



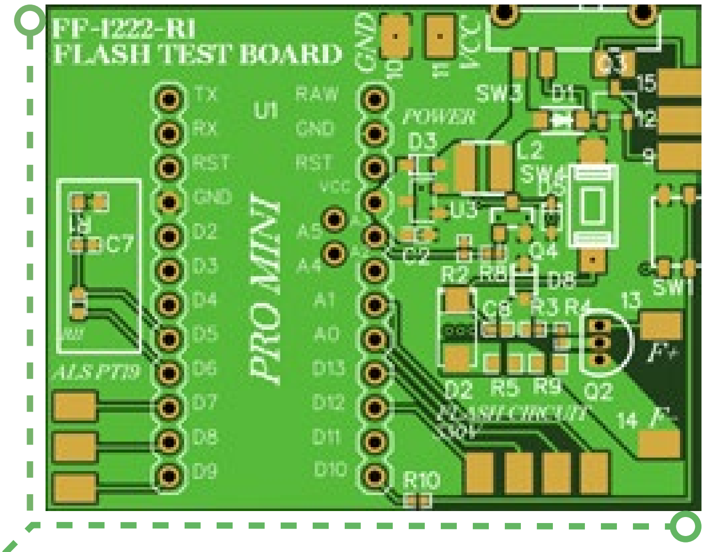
Prototyping

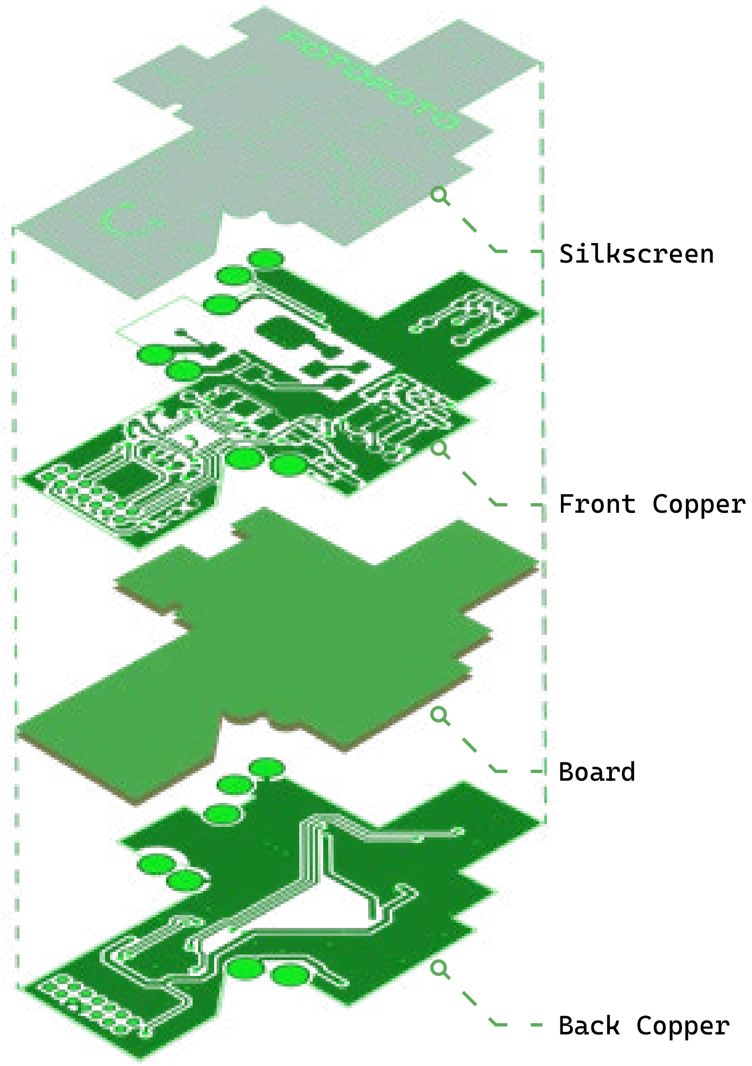


First prototype test board, arduino powered, with large pads to solder wires to



Initial circuit diagram, Code debugging & Power Efficiency Testing



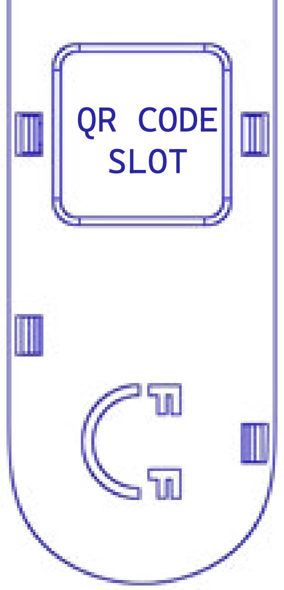


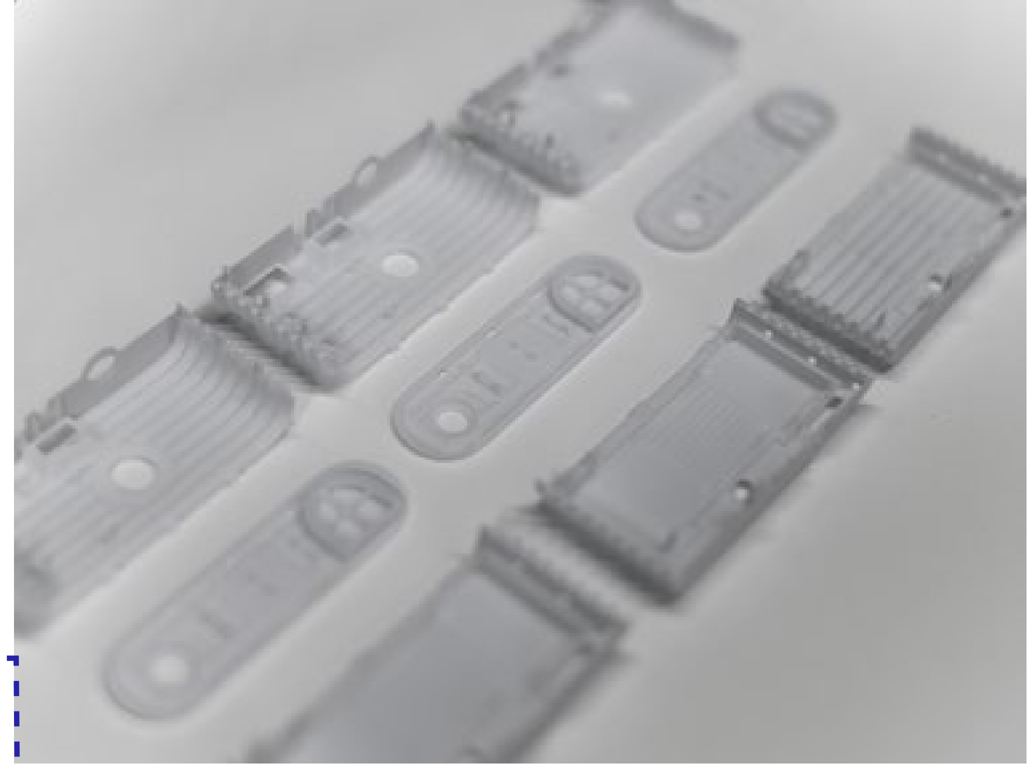
Final board design, made to attach onto the existing flash board through castellated pads

The board has a few design challenges, it has to run off of a 1.5V AA battery as power source, which has to be boosted to 3.3V for the MCU, as well as boosted to 300V by the original flash board, the flash capability then has to be triggered by the MCU. the MCU has to manage all of this, and be able to wake up from sleep to trigger a flash within a few microseconds, befor going back to sleep to save power.

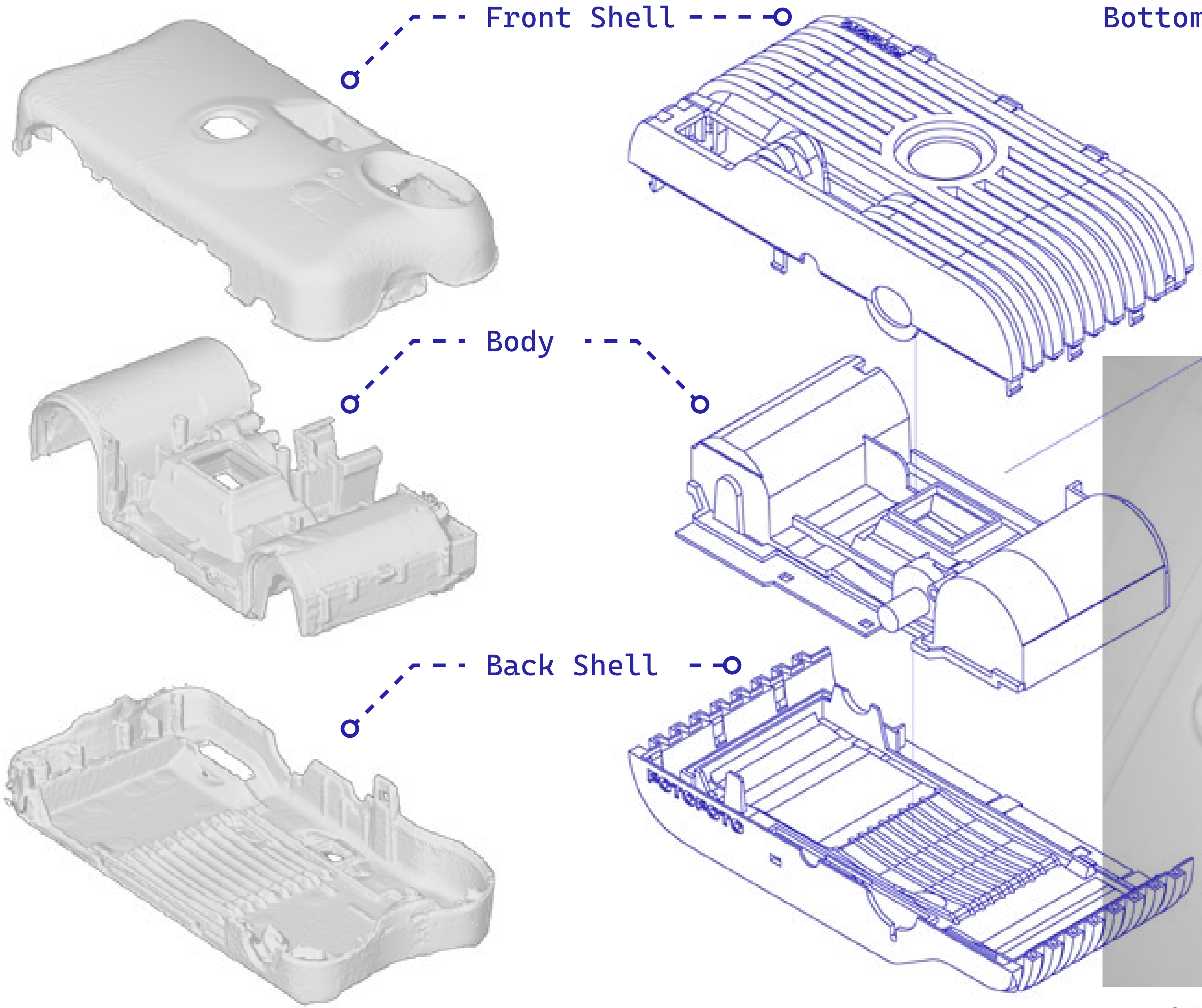
Reverse Engineering

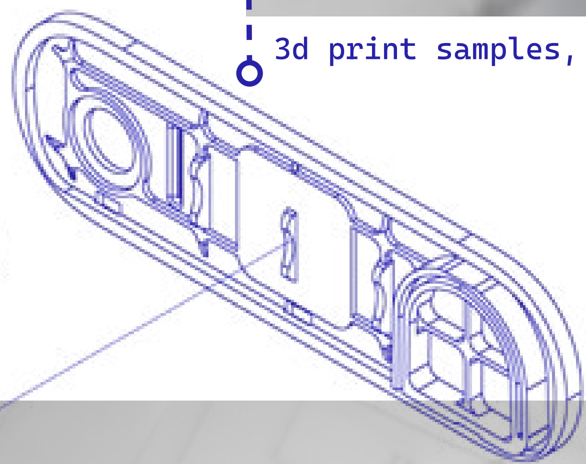
Since the project was going to use existing disposable cameras as a source, it was necessary to reverse engineer and remodel many of the features the existing design. To do this I 3D Laser scanned the shell and core of the camera, and then surface modelled it in Fusion 360. The original shell has a general +/- 0.05mm tolerance, which we needed to match, a few rounds of 3d printing were necessary to check the fit and find all small inconsistencies. We opted to go for a 3 piece design instead of 2 like the original design, so that it would be easier to disassemble and reuse without breaking the snap fits.

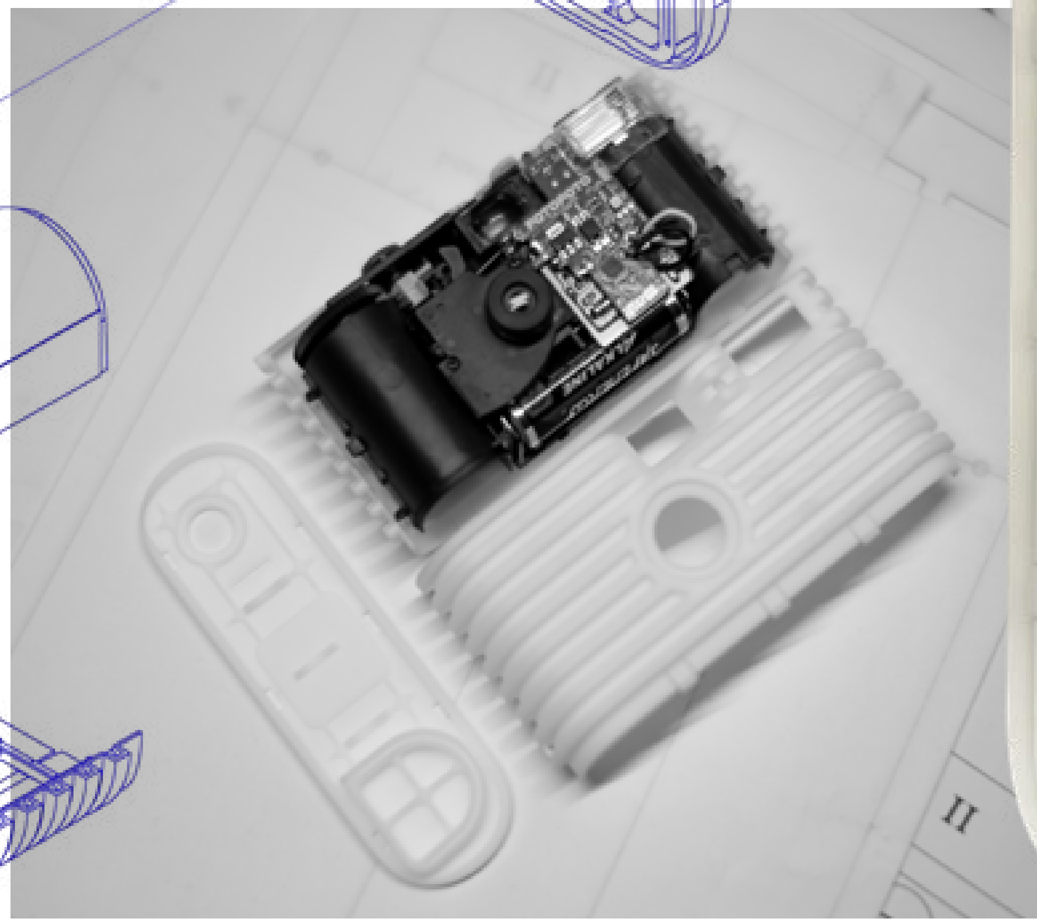




3d print samples, testing different functional features



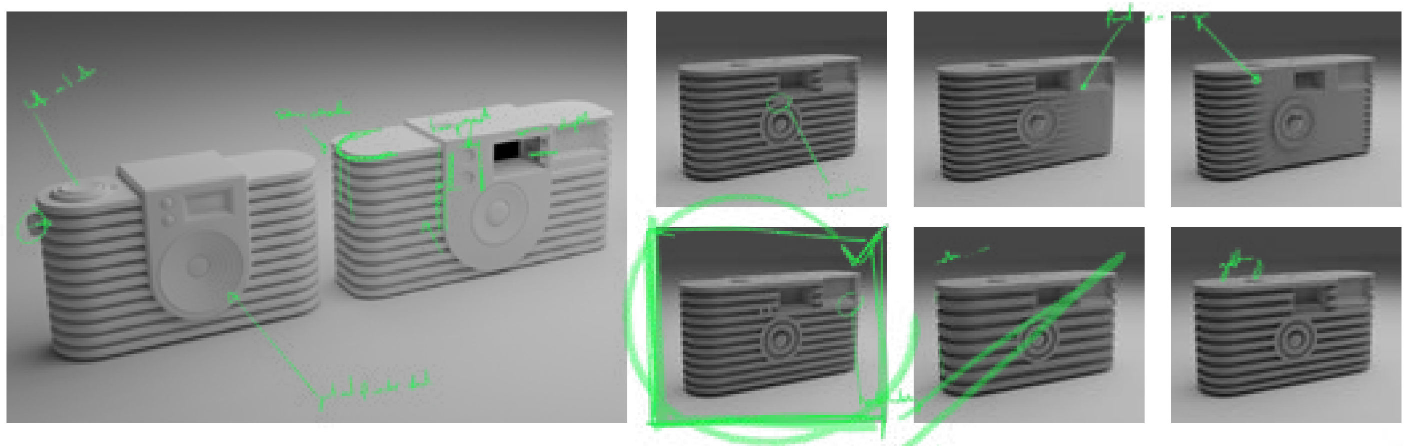


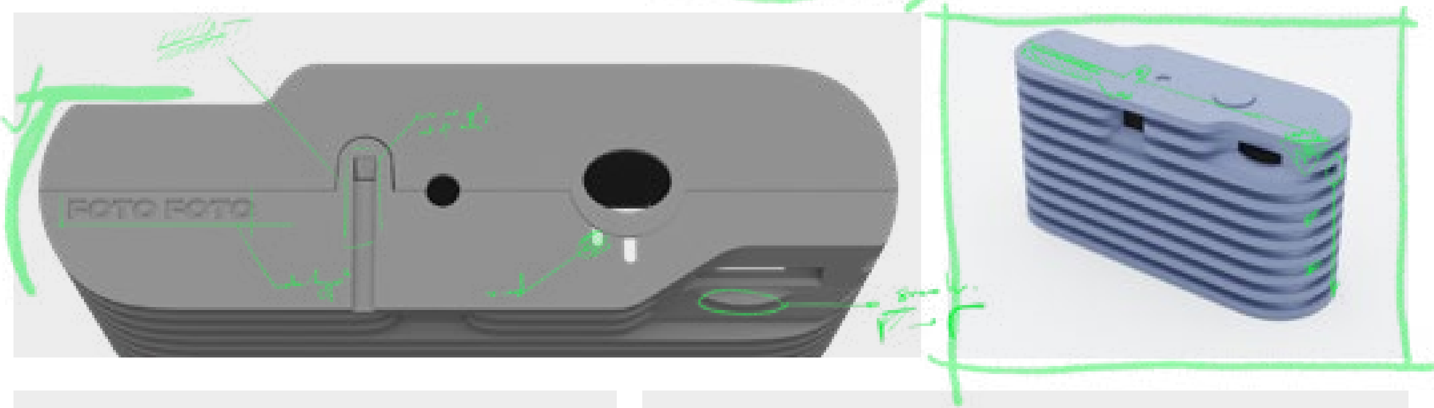


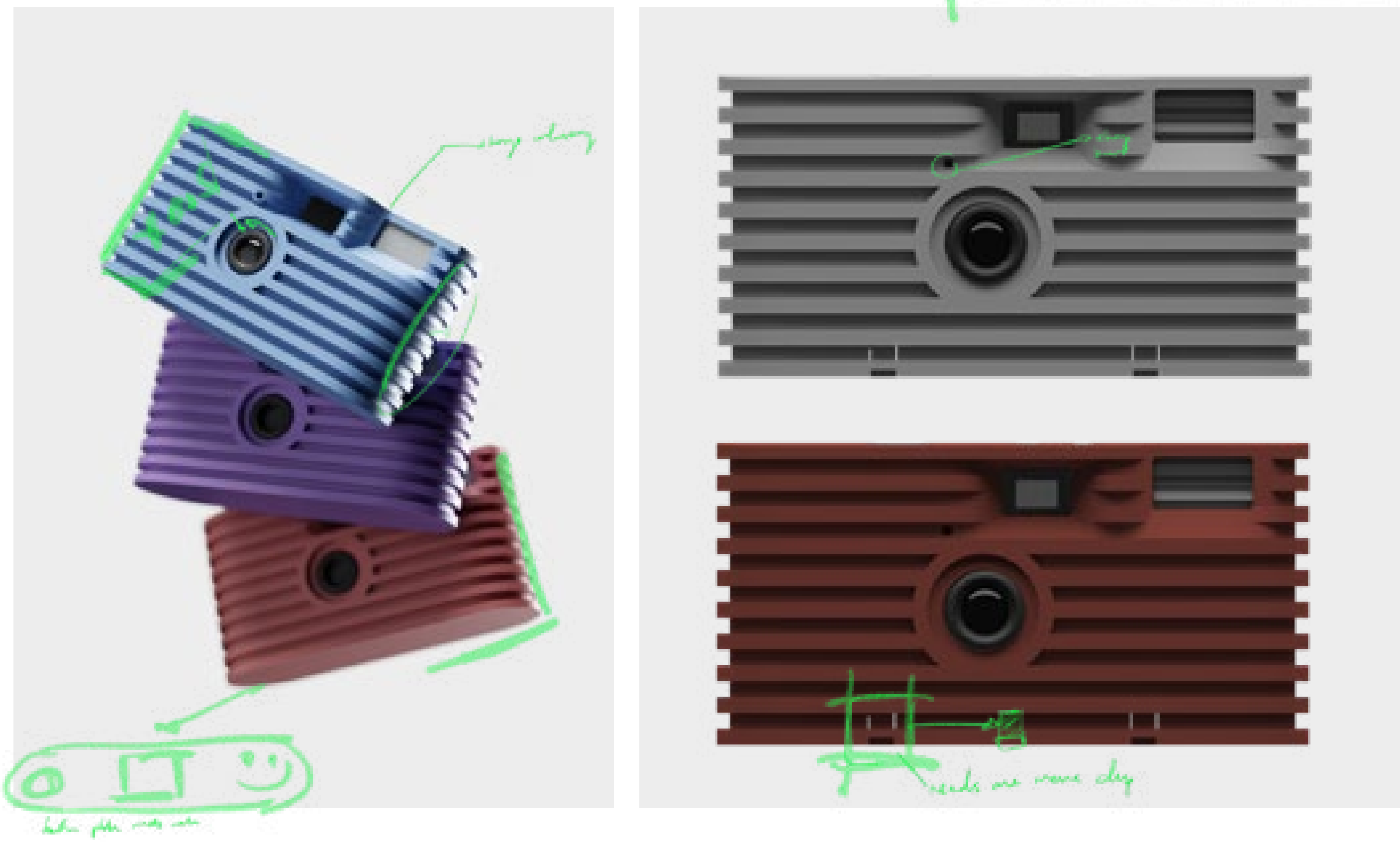
Last fully functional prototype test, two pads had to be switched on the pcb, hence the wires swapping their location

Industrial Design

The project came to me with a first draft of the industrial design, and a firm idea of what they wanted, notably, a design with strong linework, intended to be reminiscent of art-deco patterning. As such we worked on adapting their design to the existing disposable cameras, while tweaking and simplifying some of the aesthetics to make it more streamlined. A majority of the work was making the design functional for assembly and disassembly, while retaining light-tightness and good resistance to the shell breaking if dropped.








FOTOFOTO

About me.

I'm a product/computational design graduate, originally from Sweden, I grew up in Switzerland. I spend most of my free time designing and building cameras, which derived out of my passion for photography. This tends to combine with my other hobbies of running, climbing, or, in winter, skiing. I'm mainly interested in making physical product. I love to understand how things work, how they are made, and making my own things.

After graduting from my Masters in Computational Design in 2023, I've been working freelance and teaching computational design to the 23/24 students of the same Masters degree.