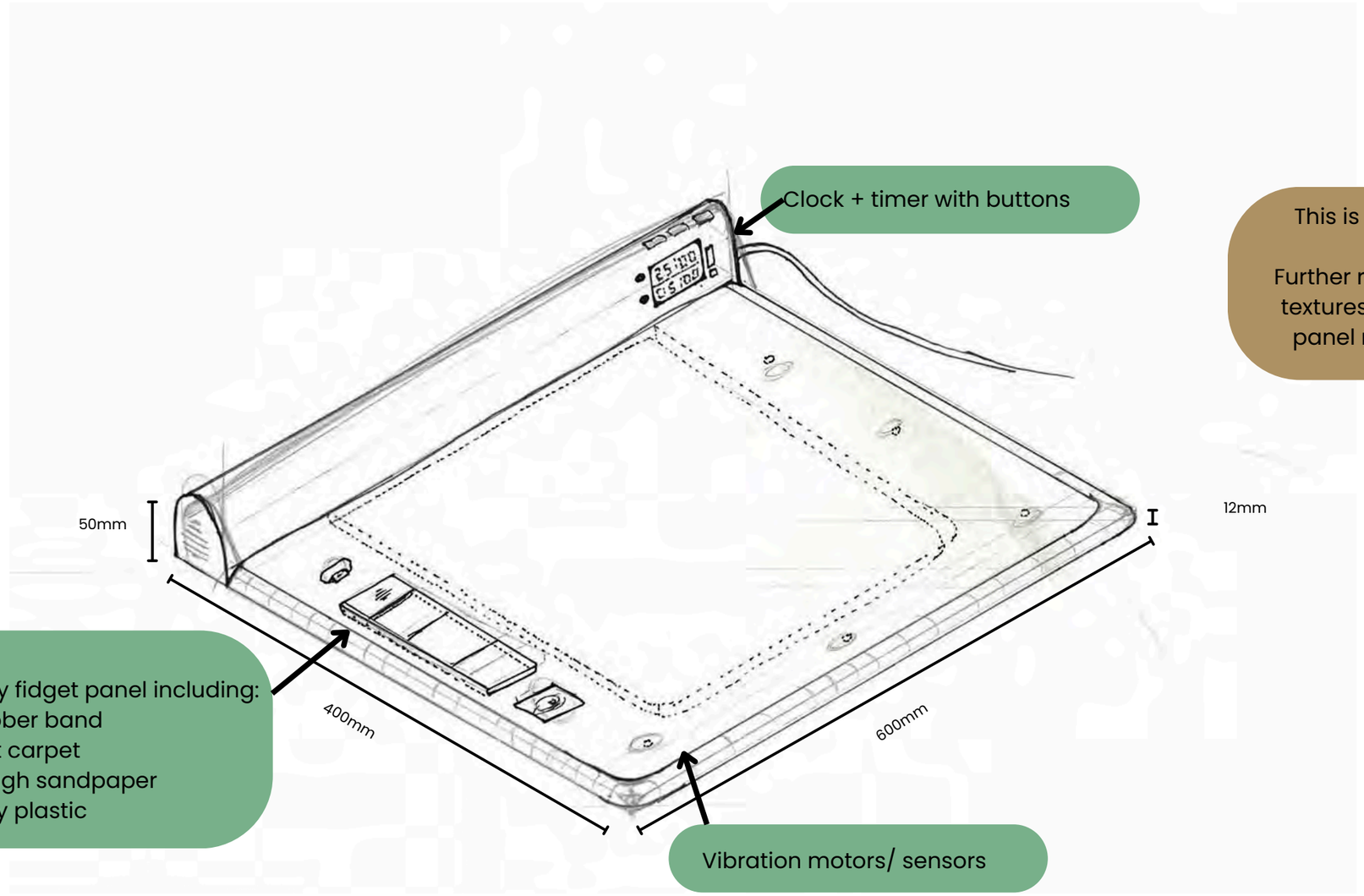
DNB311: Industrial Design Capstone DDR

Experiences of Tertiary Education for people with ADHD Part 2

Study Vibes

Nadia Shaw



This is a sound form.

Further research into the textures for the sensory panel must be done.

Critique:

It is possible that this form is too bulky, and does not provide enough innovation in terms of form.

This should be explored in physical prototyping further this week and next week.

Week 12 | Researching stimulatory materials for neurodiversity

The design has now evolved to include a space for sensory stimulation on the mat, which has been incorporated based on the primary and secondary research that was conducted earlier in the project.

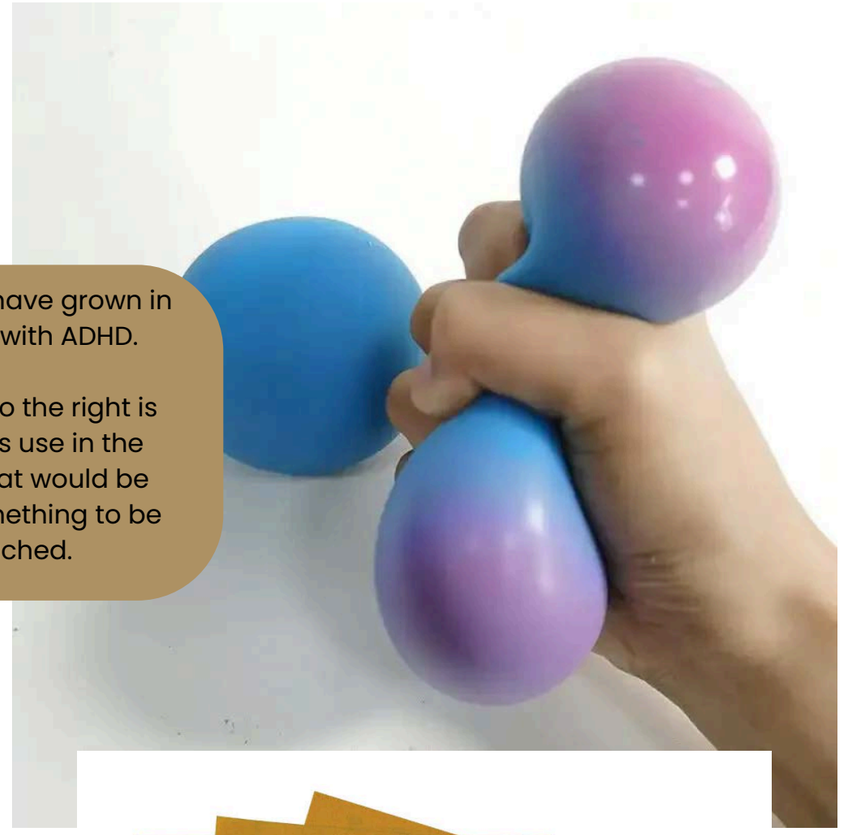
After prototyping the sensory panel drawer, it was decided that that model was too complex, and would not be commercially viable for mass manufacturing.

The modified design takes the same idea of the sensory panel, and makes it an external and aesthetic feature on the top of the mat, with interchangeable sensory pieces to meet the needs of the user.

For people with autism and ADHD, sensory stimulation is very important for focus and emotional regulation, therefore this is a critical element in the design of this project.

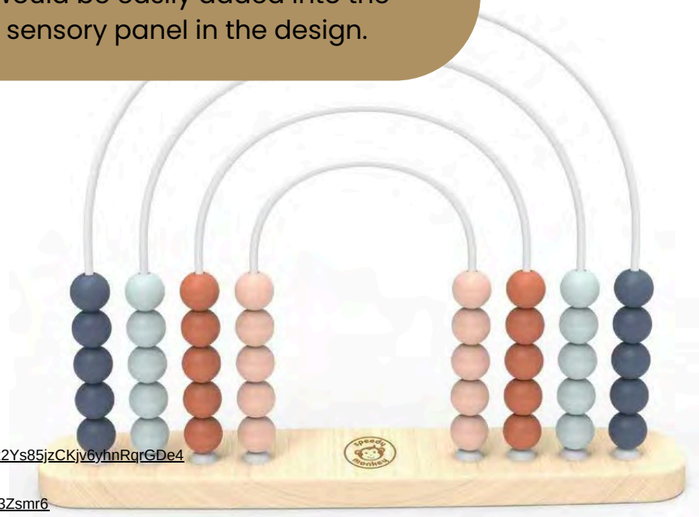
These popping panels have grown in popularity for people with ADHD.

This squishy material to the right is also good, however its use in the context of the desk mat would be impractical as it is something to be held, not just touched.



What about having a foam flower or abacus beads to move around? This would be easily added into the sensory panel in the design.

Here, soft textiles are shown. This can be good for people to stroke to change their centre of focus.

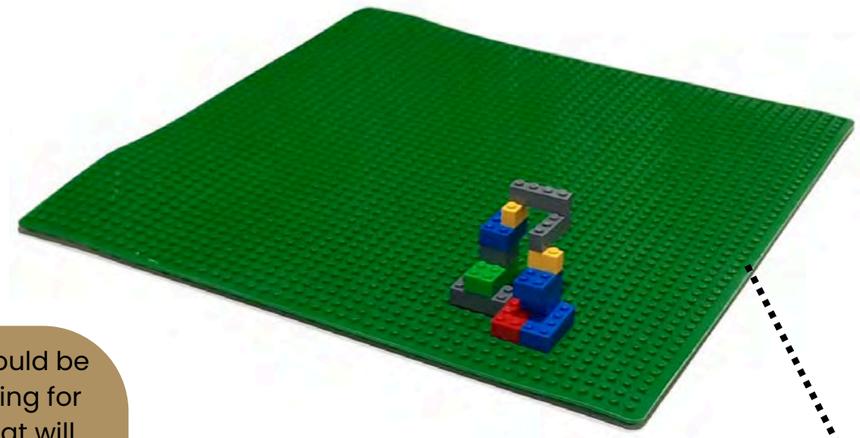


Here is some rough sandpaper. This would help users to ‘ground’ themselves.

A prototype incorporating these elements should be made to see if this is a viable direction.

https://aussieslimeco.com.au/products/color-changing-flour-vent-tpr-soft-rubber-rainbow-ball-01-6cm?srsltid=AfmBOoqayQcx0nucr1K3qPwzVXXs52zSSz2Ys85jzCKjv6yhnRqrGDe4
https://www.kawaiikids.com.au/products/abacus-rainbow-1?srsltid=AfmBOop_GOXNQFUp1GLPLxRHnYvxZNT36Os0L4_vn8VuutUUiUgPfWFQ
https://www.learningresources.co.uk/alphabet-sensory-bubble-poppers-set-of-6?srsltid=AfmBOoqTB7Ti4poLn_LIodXcdOGTBVNvjRKAP-QQ-7Rxf-CGHy3Zsmr6
https://homecrafttextiles.com.au/products/faux-fur?srsltid=AfmBOoohlhuYEbdp1tmgK0LLzgVN-NWC7I28bHkox8ubmOJ9-QXmAG1B
https://www.bccoatings.com.au/products/255p-fre-cut-sandpaper?srsltid=AfmBOoqiy58bMl9vBMaxMXztJ2qb_H_IeVO-mfty2j2xoshm6j9bGM0m
https://onlinepartysupplies.com.au/products/100pcs-artificial-foam-rose-flower-heads-brown?srsltid=AfmBOoqQN1dS0PkfktigdPc4Bblf0dZCVwLDqccoEkvmbUGKIrNrl-cX

Press studs or similar could be used as this is a fastening for fabric, and the desk mat will likely be covered in a fabric or a suede.



‘Lego’ like connectors could be used. This would allow the user to easily pick up and interchange the fidget/texture panels on the mat.

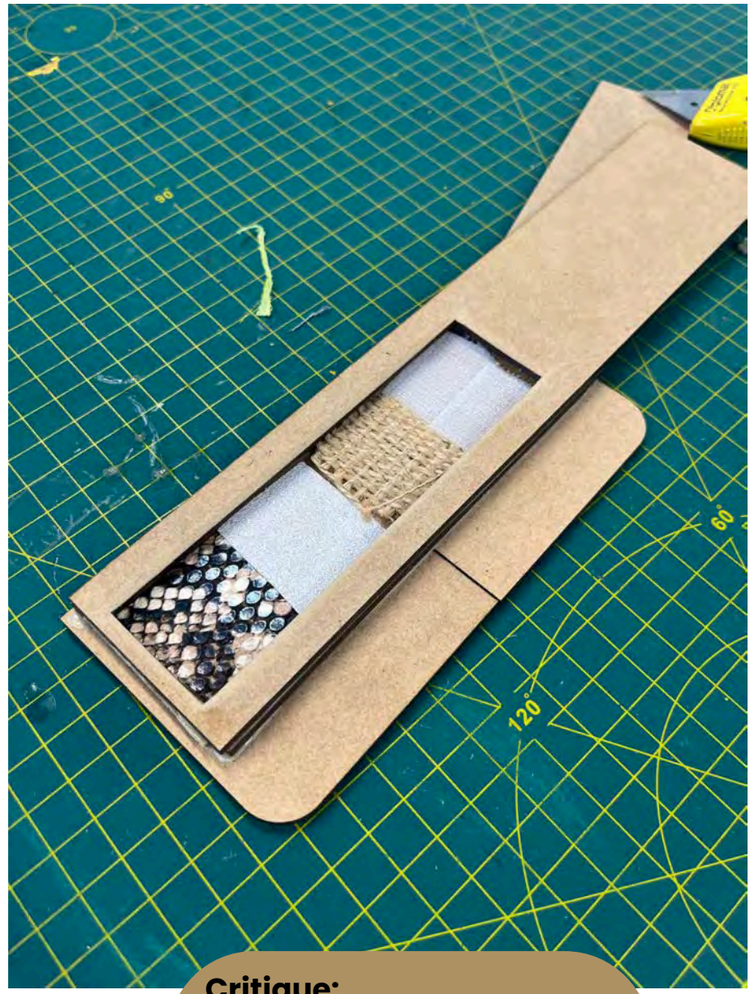
Another possible method of connection, just without the electrical component.

This will be explored in the following pages.

https://rover-education.com/product/flexible-lego-block-tape-and-mat
https://ozzytoys.com.au/products/standard-bricks-base-plate-small-20-x-10-studs-copy
https://lsleather.com.au/products/10-sets-high-quality-snap-fasteners-press-70515?srsltid=AfmBOoo0-r-TQjvrzA722Jpi3tQJbKecf2MHctbYJ3O3ImXf9WAdNmQq
https://www.amazon.in/Hi-PLASST-Plug-Royal-Male-Female/dp/B092DDF19Z?th=1

Here, a drawer-like prototype of the sensory panel was explored.

Sandpaper, faux leather, and hessian were used in this prototype, as well as a rubber band for the user to snap.



Critique:

Whilst there is merit and justification for this inclusion, it is cumbersome, and has potential to overcomplicate the rest of the design.

Therefore, this will be reworked, however if still cumbersome, it will be omitted from the design.

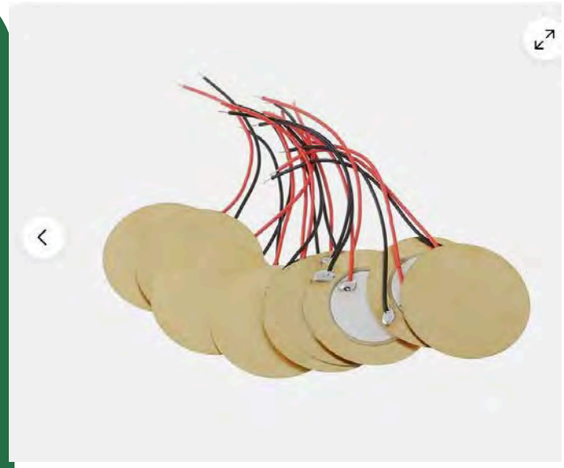
Week 12 | Further technology research and design development

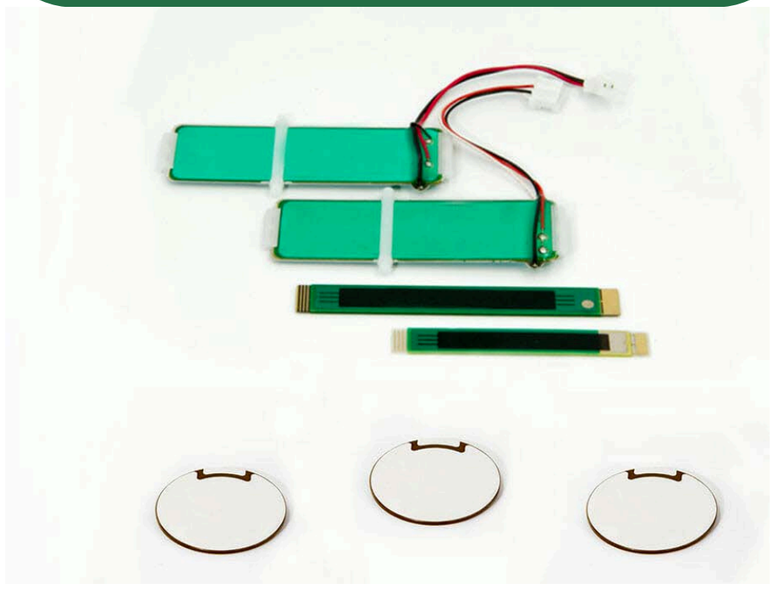
After exploring the small vibration motors which were sourced for this project, it was decided that whilst they are functional and provide the desired effect, the aesthetics of the design have been limited by them.

Consultation with tutors encouraged me to do further research into the technology that is currently available, or which could be available in the near future.

'Piezo actuators' were something which I discovered in my earlier research, however I limited myself by my technical knowledge and access to technology.

These devices are able to generate haptic feedback, triggered by pressure or an electric current. They can be as thin as 1mm, and would offer a similar tactile experience as the 3mm vibration motors used in the testing. They are also used regularly in wearables and smart phones, due to their versatility and small size.





The **Piezoelectric Biomorph Actuator** is another version of the technology which could be used. The benefit of these is that they are slimline and long, rather than round in shape.

They are commonly used in devices such as:

- Alarms
- Smoke detectors
- Buzzers
- Touch input responses

Therefore, this could be a viable technology to integrate into the final design.

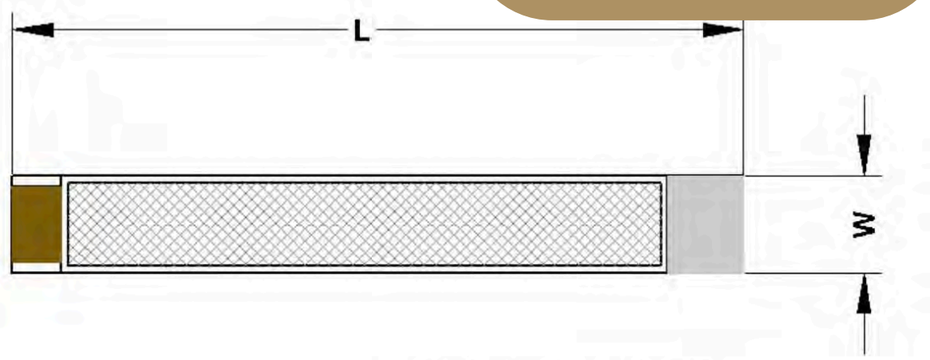
Piezo Bending Actuators (bimorph/trimorph)/QDTE52-2(4)

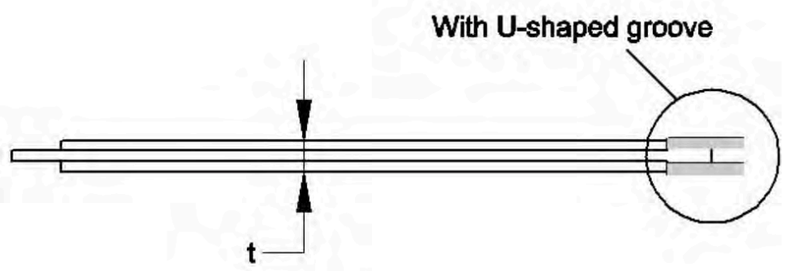
Quantity: 1

Inquire Add To Basket

These thin strips will easily be placed within the desk mat, and would provide significant sensation to the user.

Dimensions





Specification

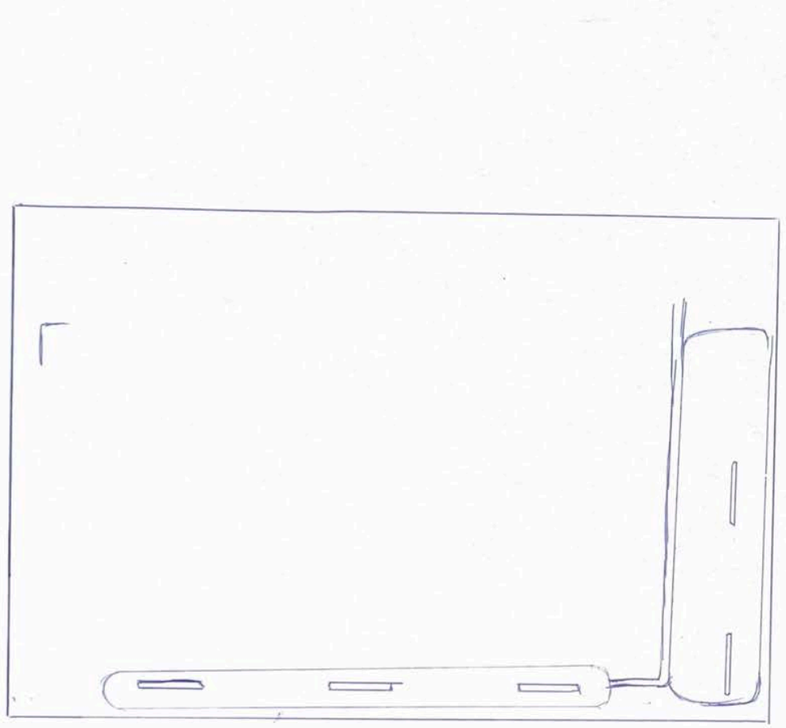
Model	Dimensions	Nominal displacement	Blocking Force	Leakage Current	Electrical capacitance	Remarks
	L×W×T[mm]	[mm@1Hz]	[mN]	[μA]	[nF@1V, 100Hz]	
QDTE52-7.0-0.82-2	52×7.0×0.82	≥0.9	≥300	≤0.5	36~54	with U-shaped groove
QDTE52-7.0-0.82-4	52×7.0×0.82	≥1.2	≥300	≤0.5	40~62	with U-shaped groove

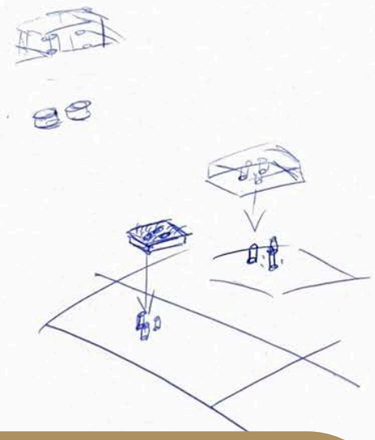
* Operating temp. -10°C ~ +70°C Operating voltage: 190V DC Frequency ≤25Hz Relative humidity : ≤80%

https://piezodirect.com/piezoelectric-bimorph

https://en.pantpiezo.com/product/piezo-bending-actuators-bimorphtrimorphqdte5224.html

https://www.ebay.com.au/itm/326535011953?mkcid=1&mkrid=705-53470-19255-0&siteid=15&campid=5338746427&customid=&toolid=10001&mkevt=1



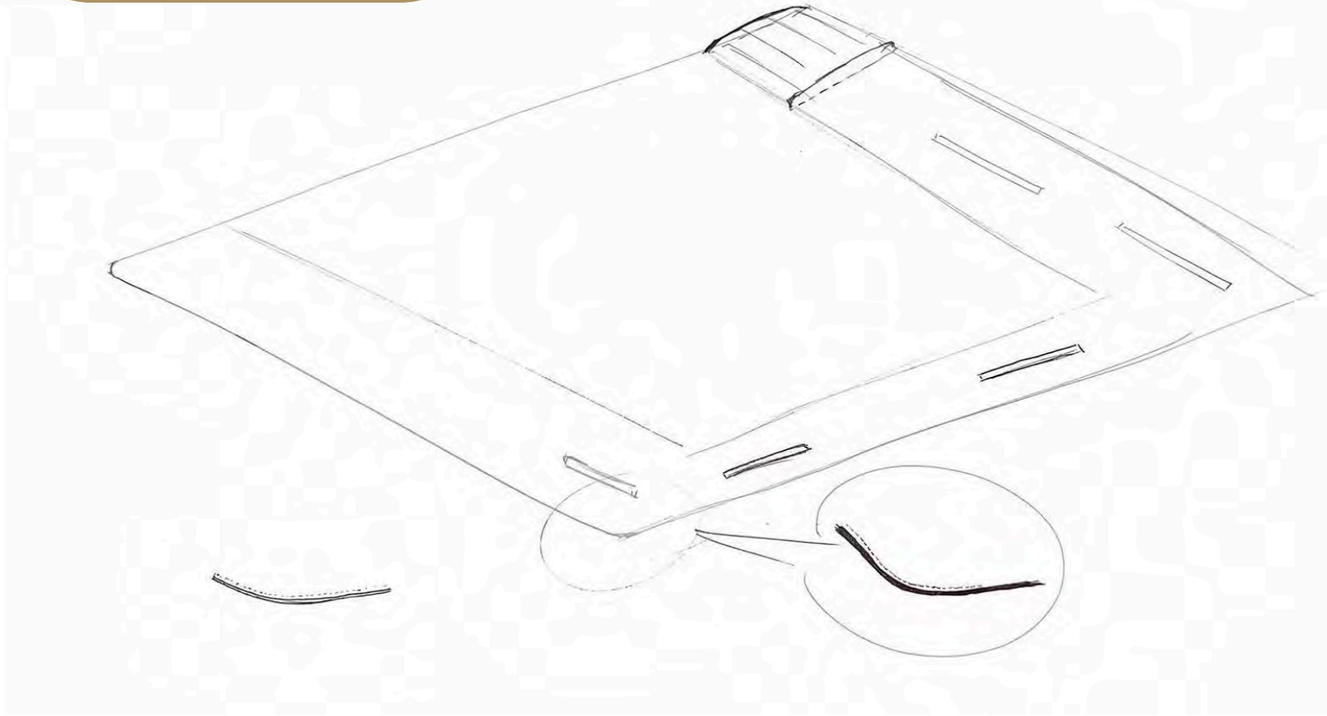


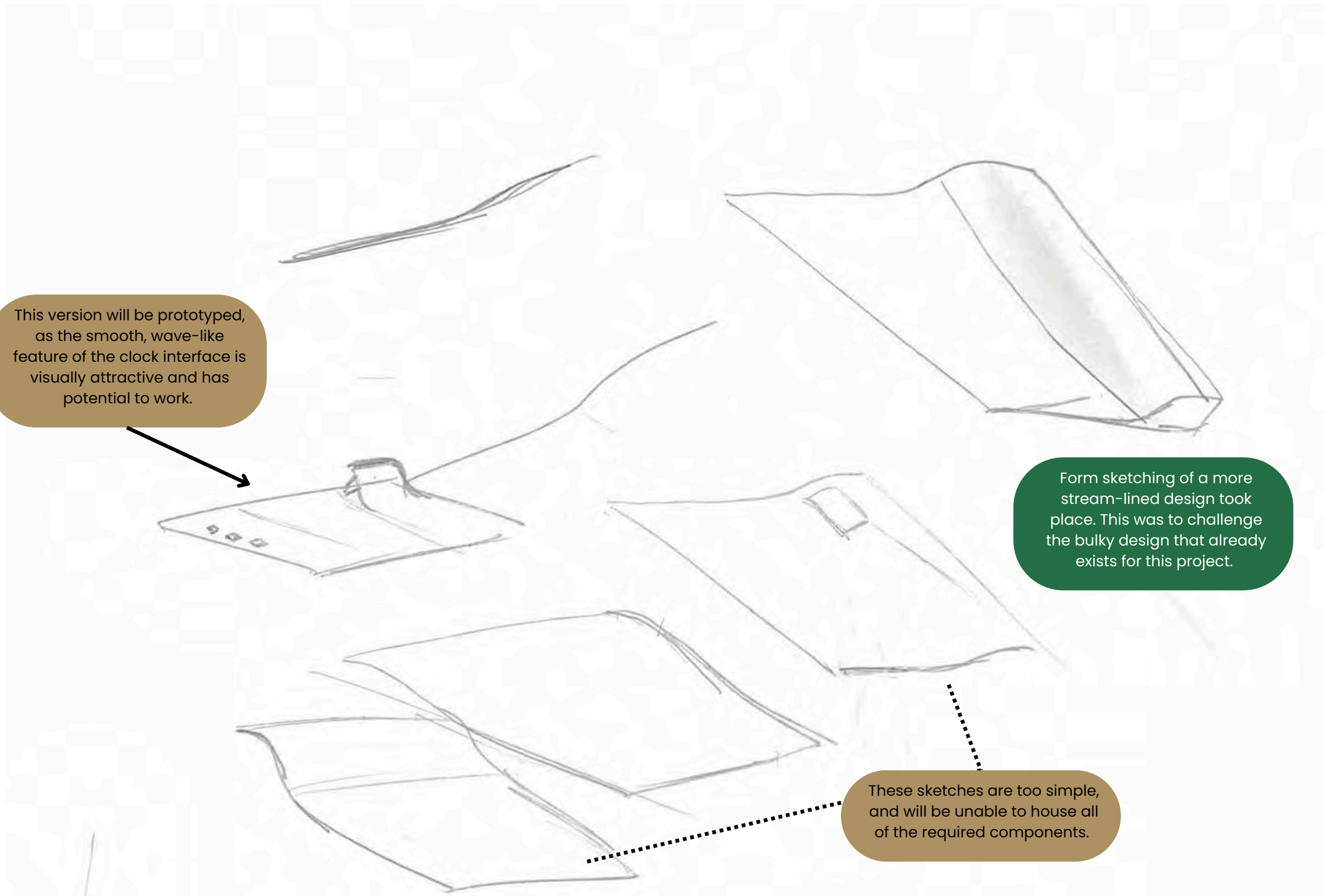
This is another sketch of the sensory panel. Here it is depicted as the leggo-like connector, with varying textures on the top of the leggo-like bricks.

Further sketching which incorporates the use of the Piezos rather than the round vibration motors initially purchased.

Critique:

These designs are very simple. The challenging aspect is working out how to make the design thin, whilst having a clock timer and potentially having the sensory panel.

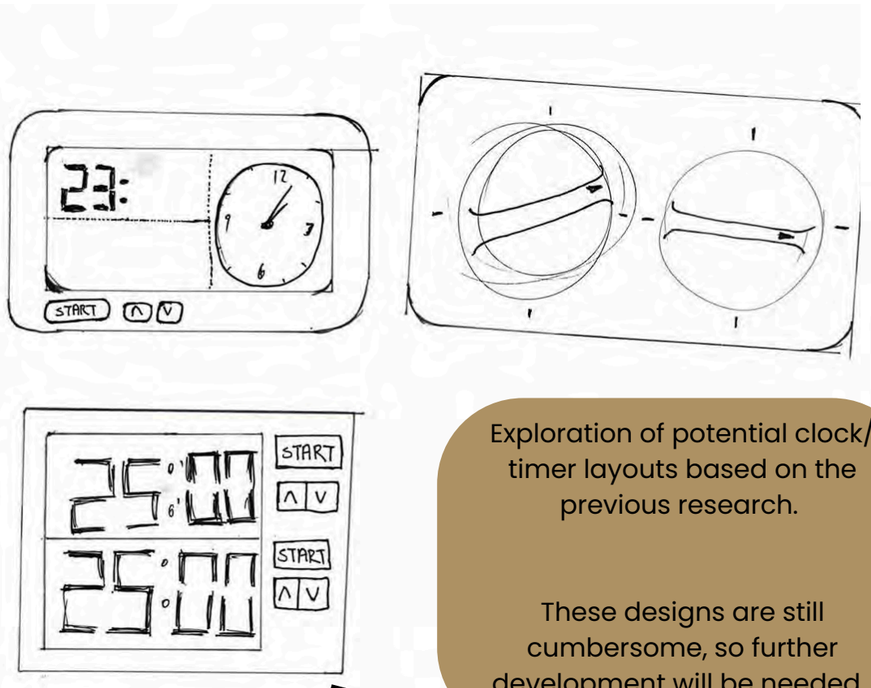




This version will be prototyped, as the smooth, wave-like feature of the clock interface is visually attractive and has potential to work.

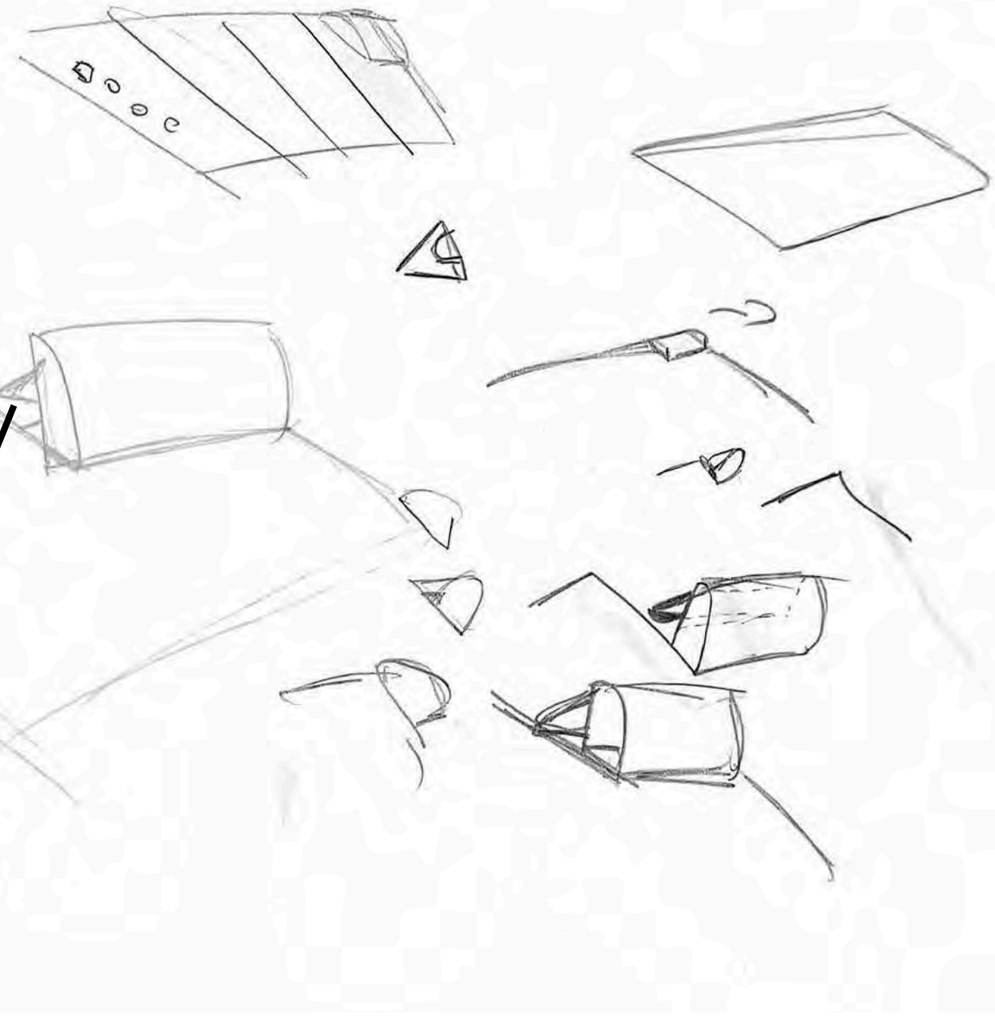
Form sketching of a more stream-lined design took place. This was to challenge the bulky design that already exists for this project.

These sketches are too simple, and will be unable to house all of the required components.



Exploration of potential clock/ timer layouts based on the previous research.

These designs are still cumbersome, so further development will be needed.

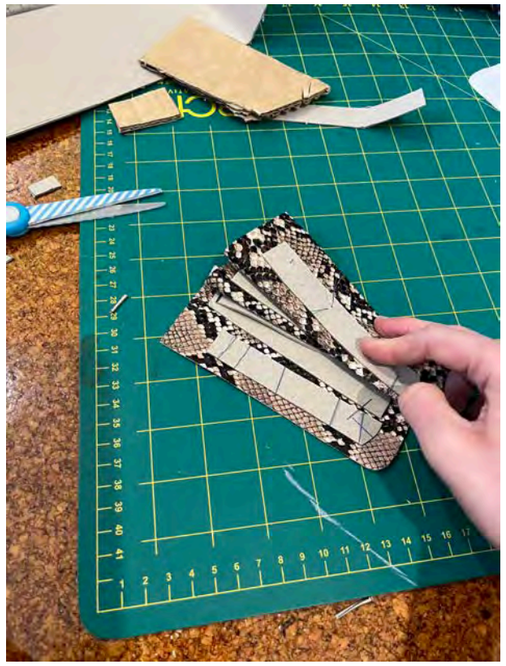


More sketching of the streamlined design. I like the use of the curves in the clock, it is smooth and could encompass elements of conicity.

Week 12 | Prototyping flexible desk mat (can be rolled up to-go)

Small sensory panel blocks are shown here.

They would be effective, however it was decided that they will overcomplicate the design, and could cause more of a distraction for the users.



Faux leather and cardboard was used to create a flexible prototype.

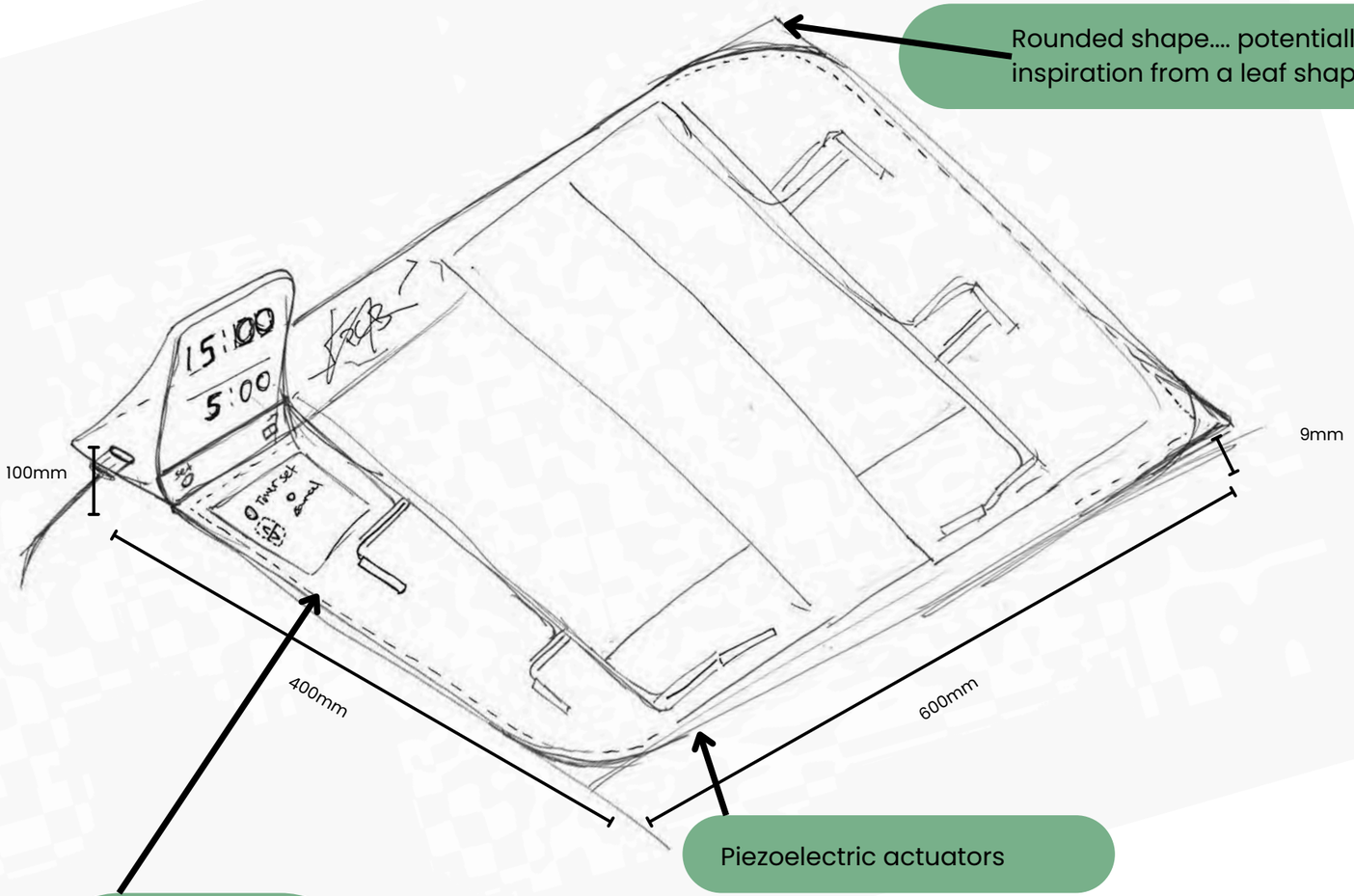
The idea was with this flexible, roll-up-ability, it would make the design more portable for use at home or at university.

Critique:

Whilst this prototype will roll up, it is not clear how the clock would attach, and where the components will be stored when its being transported.

Therefore, this prototype direction will not be pursued.

Week 12 | Design development | overall form of design no.4



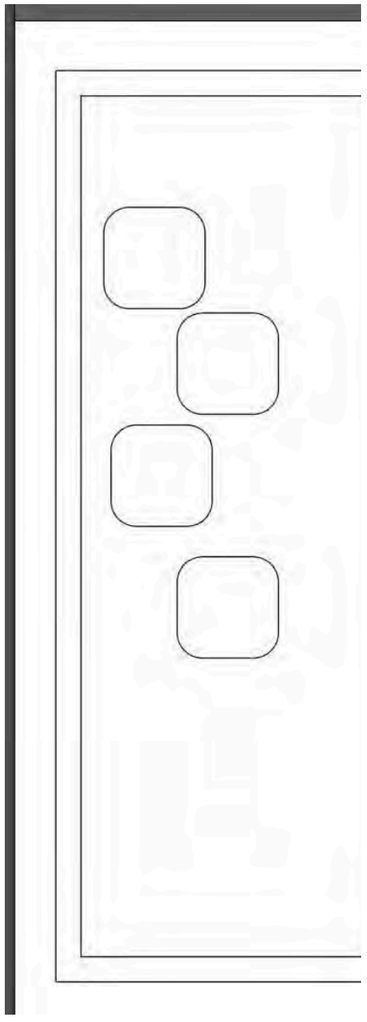
Rounded shape.... potentially taking inspiration from a leaf shape

Clock timer and control panel, vibration level controllers

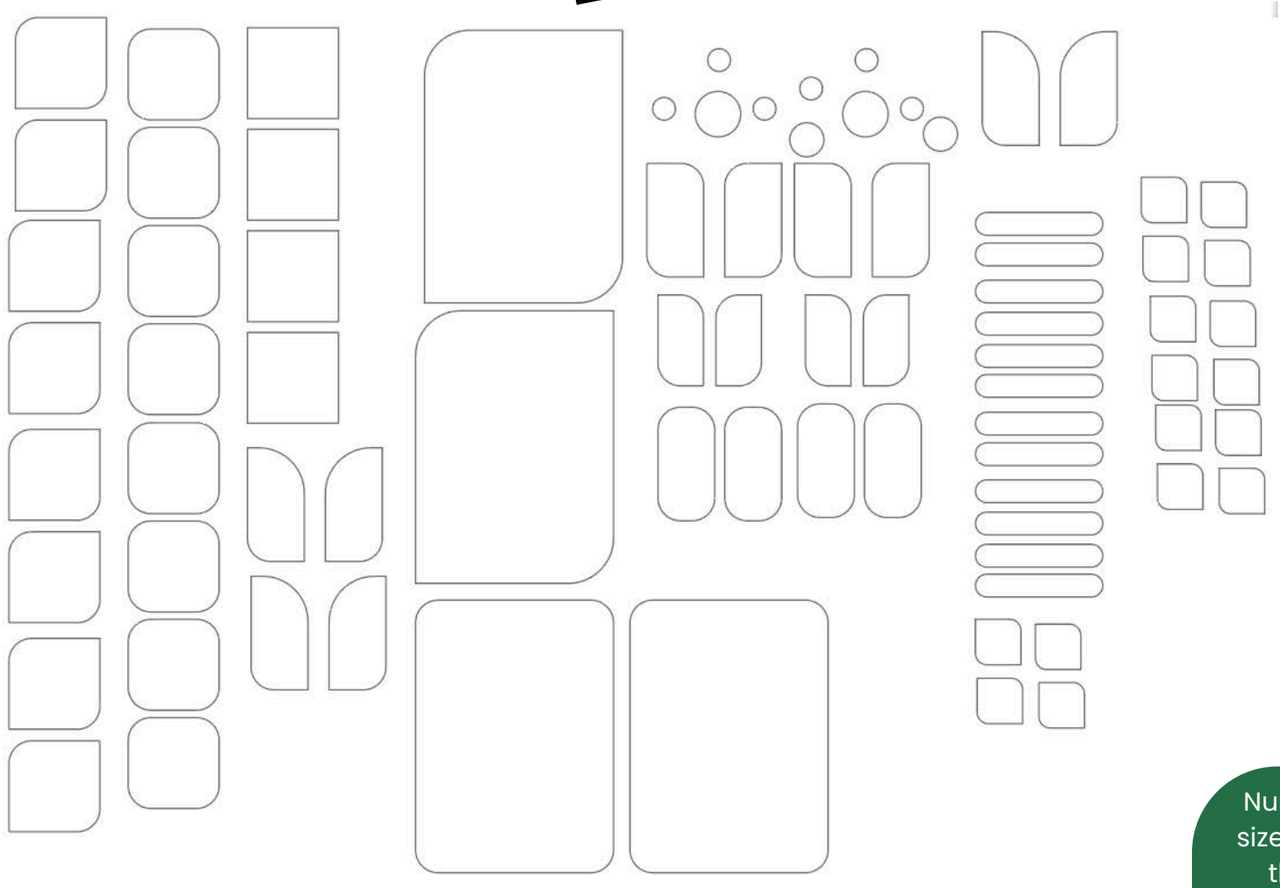
Piezoelectric actuators

This design is improving, with more scope to improve the aesthetics, symmetry, lines, and overall concinnity.

Next, the layout of the buttons, shape of the clock, and final shape of the board need to be explored.



This rectangular form with rounded opposite corners could be used here, and there is potential for this shape to be carried throughout the entire design.

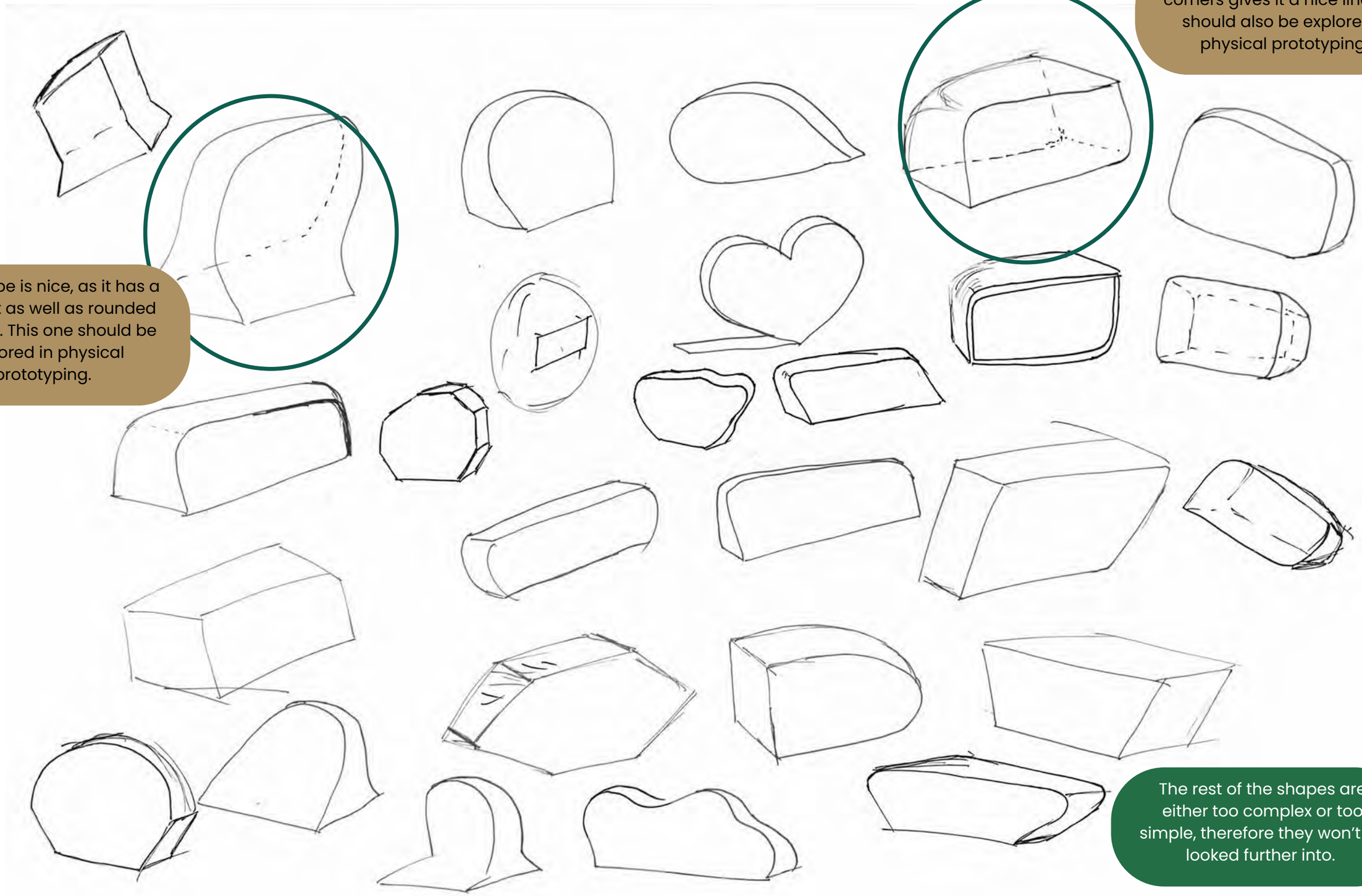


Numerous button shapes and sizes were sketched and cut so that the most appropriate layout for the buttons could be achieved through physical prototyping.

Week 12 | Design development | forms for clock/timer

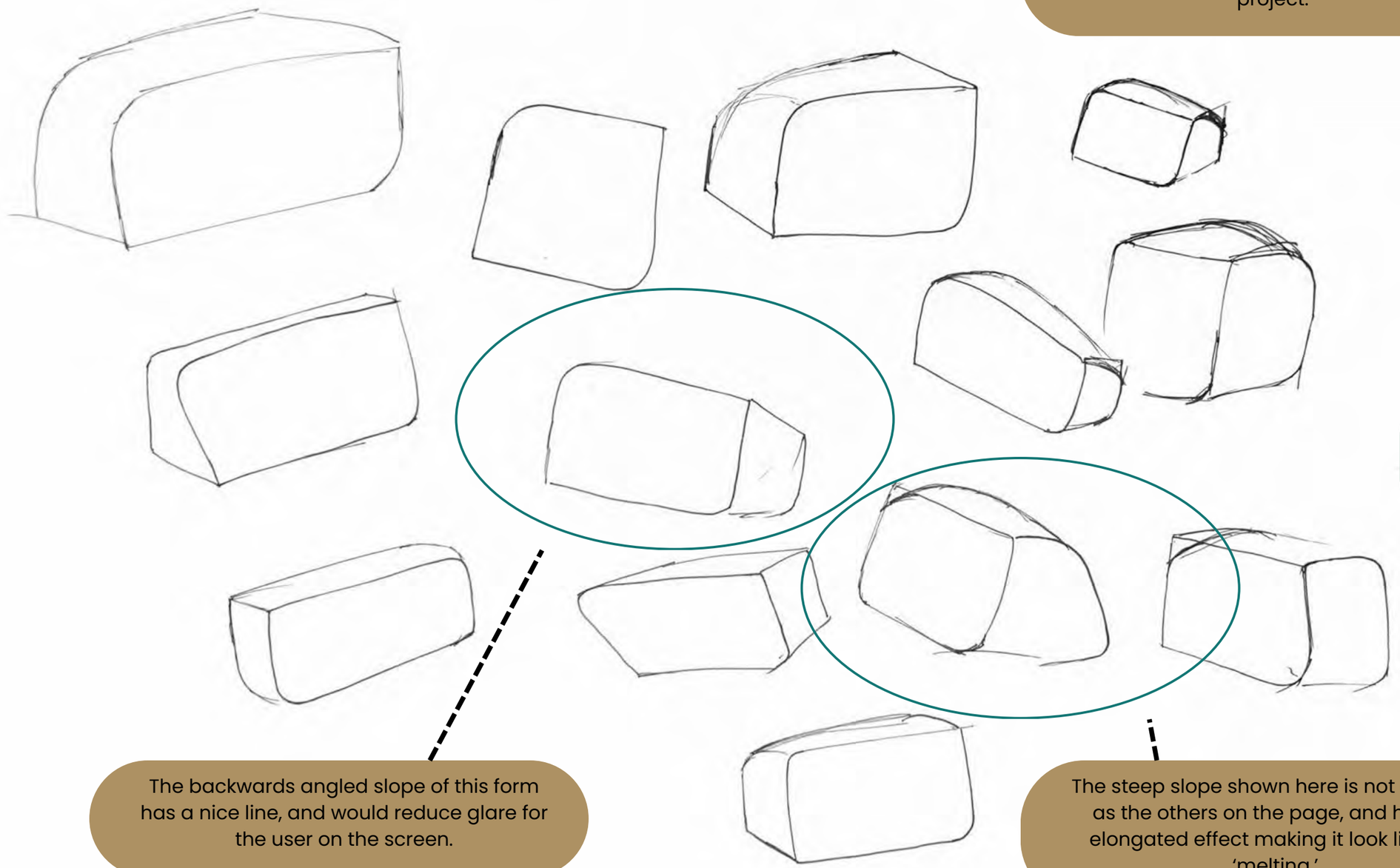
This form's rounded opposite corners gives it a nice line, and should also be explored in physical prototyping.

This shape is nice, as it has a flat front as well as rounded features. This one should be explored in physical prototyping.



The rest of the shapes are either too complex or too simple, therefore they won't be looked further into.

As previously explored, the form with the rounded opposite corners is ideal for this project.

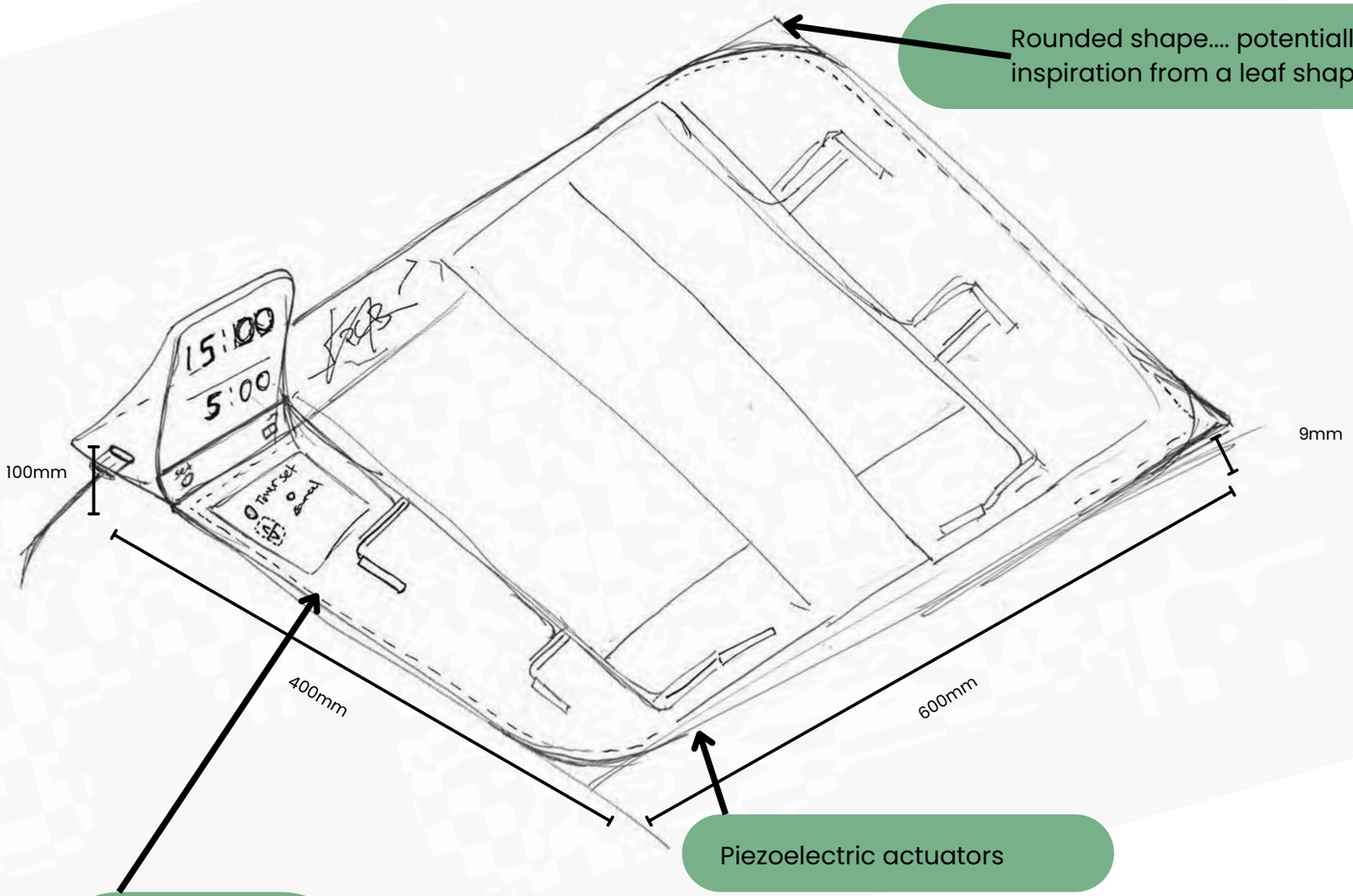


Moving forward, these shapes will be explored in foam prototyping form to achieve the best result for the form of the clock/timer.

The backwards angled slope of this form has a nice line, and would reduce glare for the user on the screen.

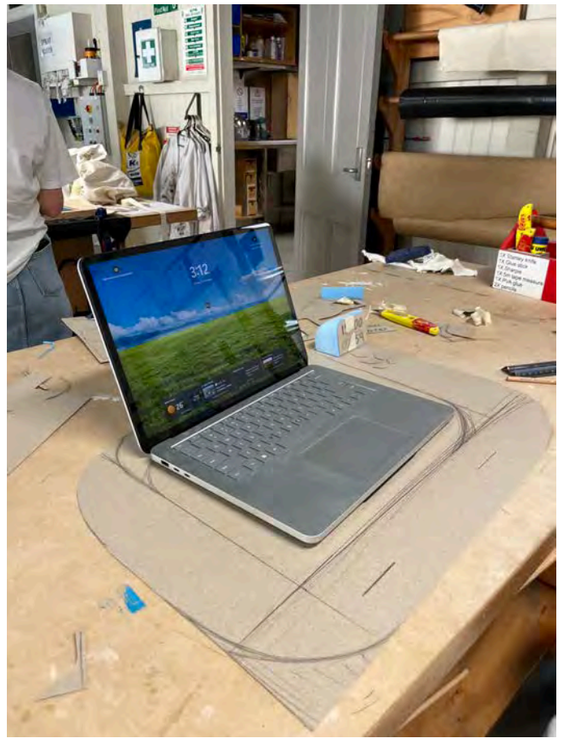
The steep slope shown here is not as good as the others on the page, and has an elongated effect making it look like it is 'melting.'

Week 12 | Design development | overall form of design no.3



This design is improving, with more scope to improve the aesthetics, symmetry, lines, and overall concinnity.

Next, the layout of the buttons, shape of the clock, and final shape of the board need to be explored.

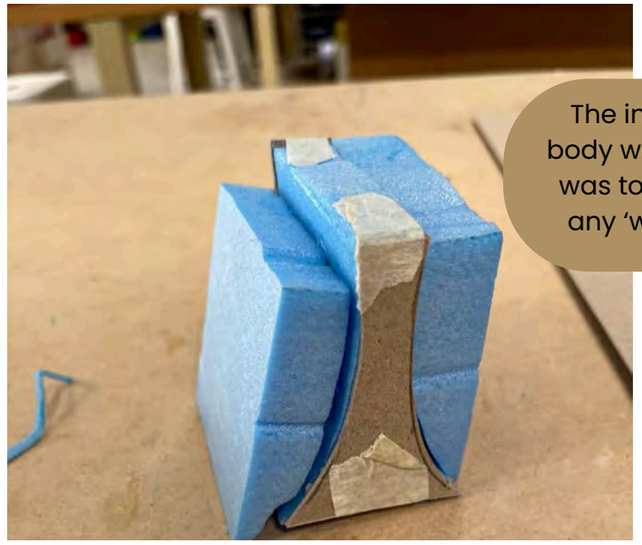


This is the best shape, and will be the shape that is kept for the duration of the design development.

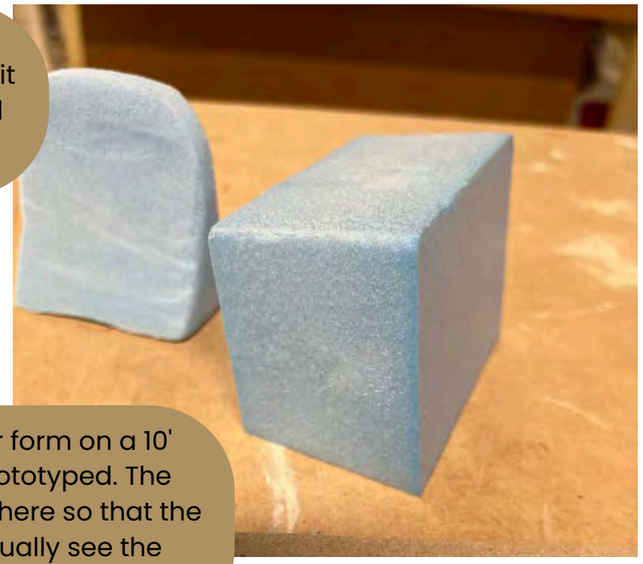
The mat started out as a rectangle, but evolved into a leaf-like shape with two rounded edges through physical prototyping.

In the final design, there should be a separate centre piece which follows the same line but offset.

This is so that there is an internal piece that is less affected by the vibrations for the laptop to sit on. It also means that there will be channels created for the electrical wiring of the piezos in the model.

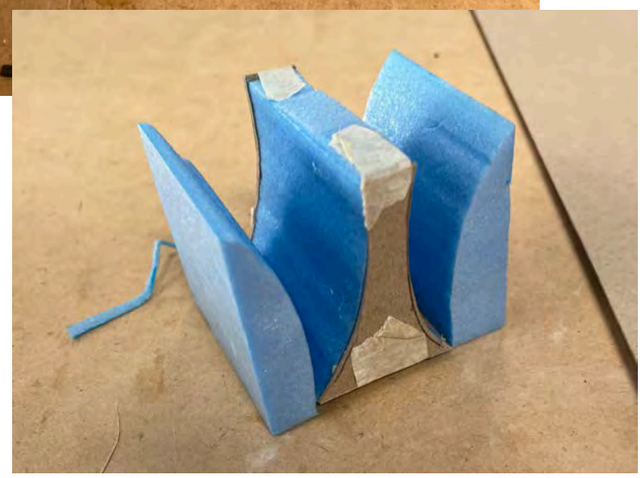


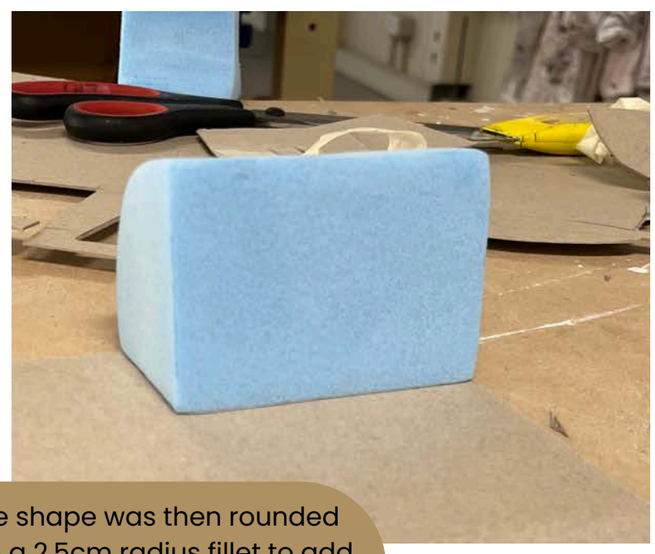
The initial bell-shaped solid body was not appropriate, as it was too thin, and did not add any ‘wow’ to the aesthetics.



A rectangular form on a 10' angle was prototyped. The angle was put there so that the user can actually see the screen, and to avoid glare.

Blue foam prototyping was used to determine the best form for the clock/timer.



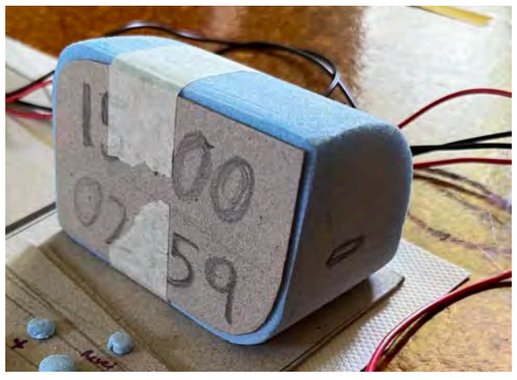


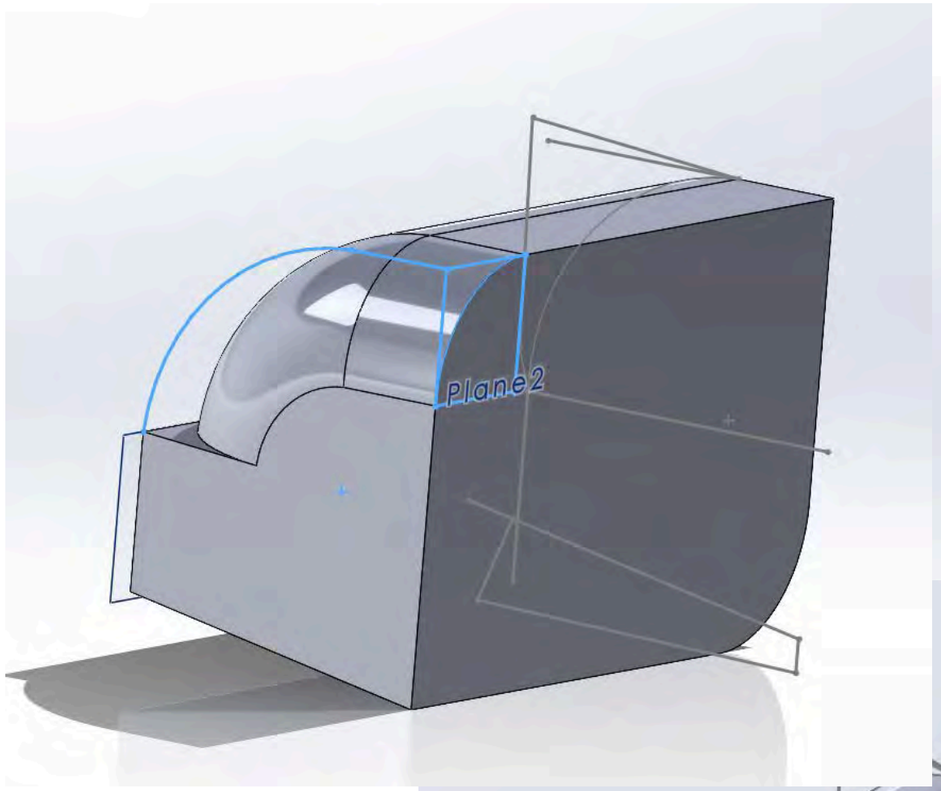
The shape was then rounded with a 2.5cm radius fillet to add appeal.

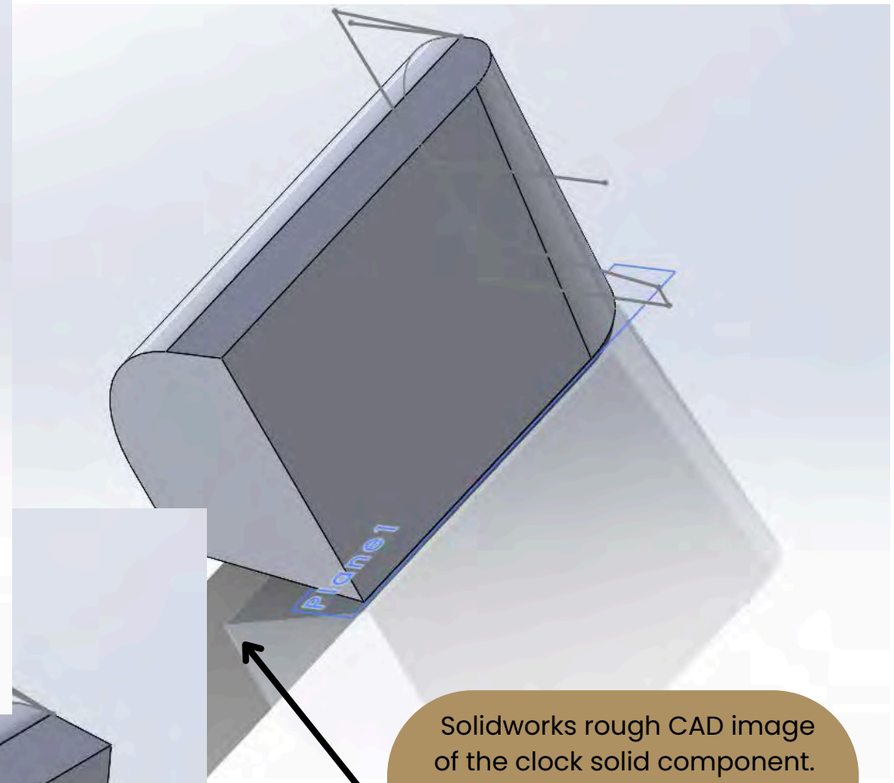
This was good, however more needed to be done.

using the same shape as the mat, the clock was then rounded in the opposite corners, as well as across the top-back edge.

This is the final form for the clock.

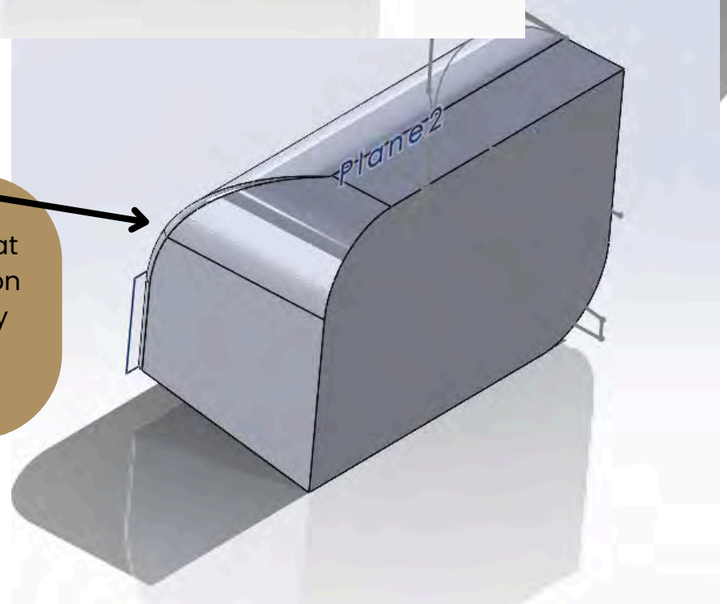






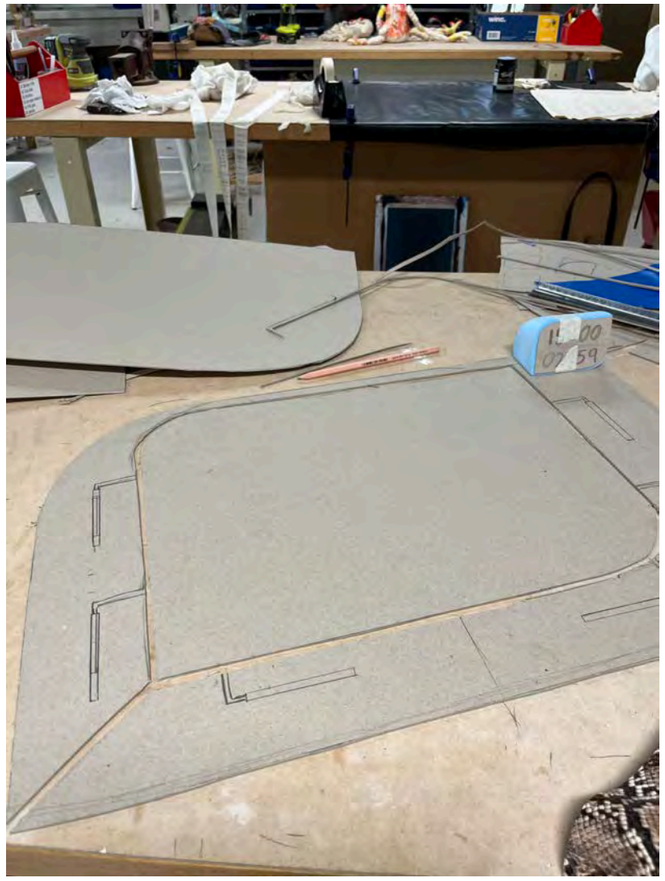
Solidworks rough CAD image of the clock solid component.

This shape will be a shell, with internal ports, buttons, and a screen.



This is an attempt at using the variable fillet tool. It did not work at first. however with some dimension tweaking, the end result was very similar to that of the blue foam prototype.

Further work on the CAD model is required for this project.



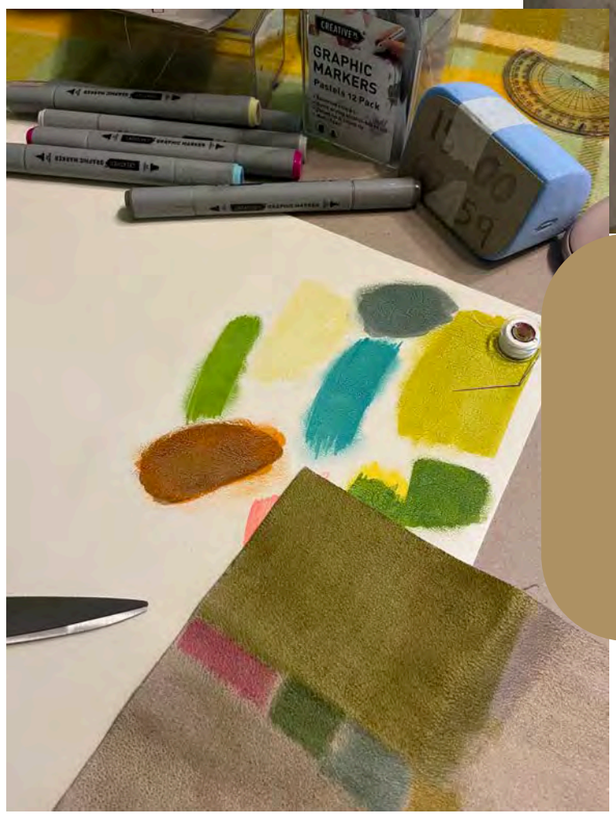
Internal look at what the wiring and placement of the piezos could look like. IT is important that these components are kept flat to avoid damage.

In the channels shown in the prototype, the wires will run. They will be sandwiched between two layers of thin foam as a protection.

Rear corner view of the rough prototype of the final design form.

I was inspired by the shapes and colours of leaves for this project.

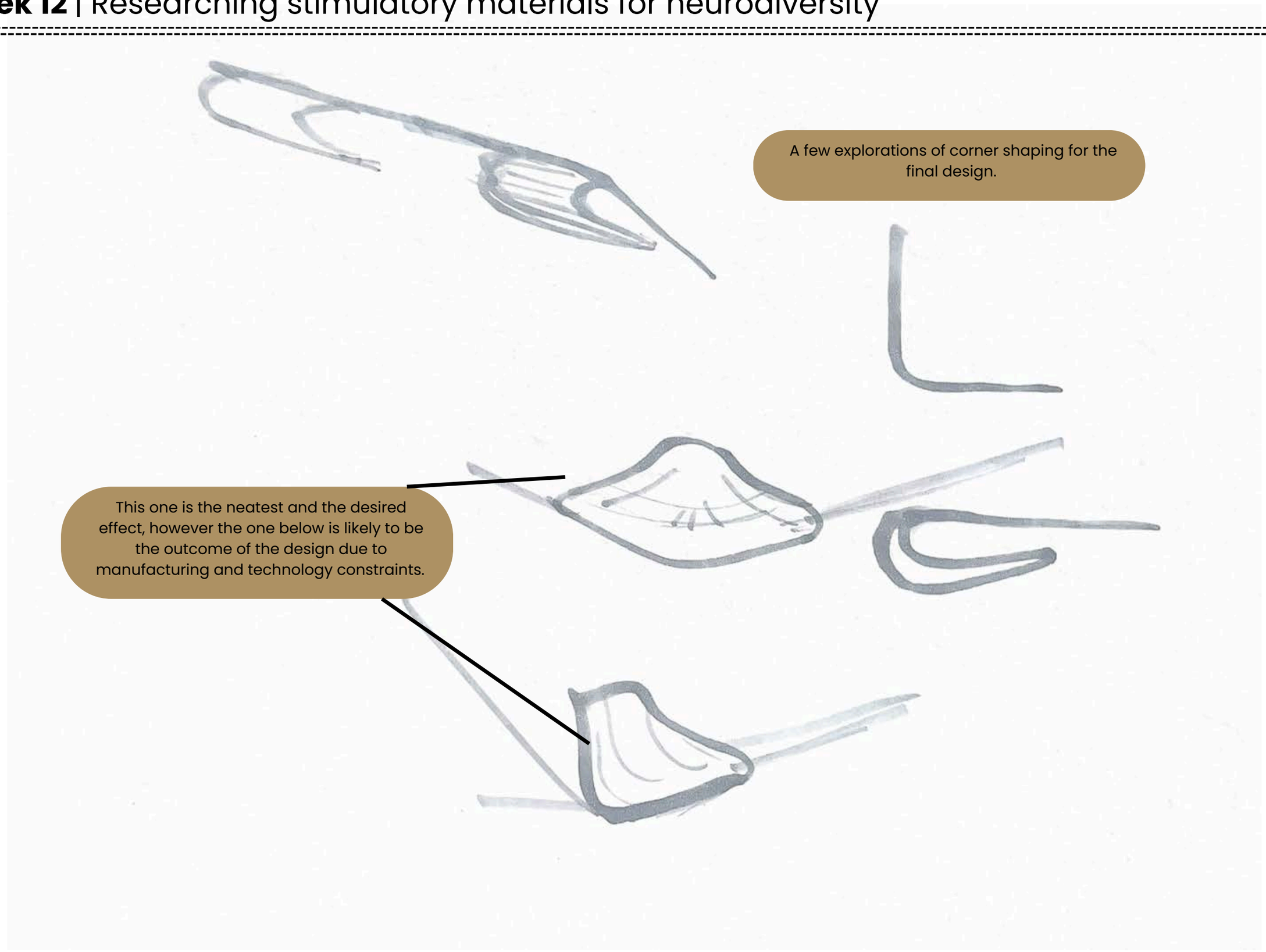
The exterior material of the desk mat is going to be a aux suede, as it is comfortable functional in the context of a study mat.



Unfortunately, the only material available was in taupe. Initially, I did not like this colour, so it was decided that I would manually colour in the fabric with alcohol ink markets.

This was somewhat successful, however the finish was not clean enough for the presentation.

Despite this, it is intended that the green colour will be highlighted on the product, likely in the clock and control panel.



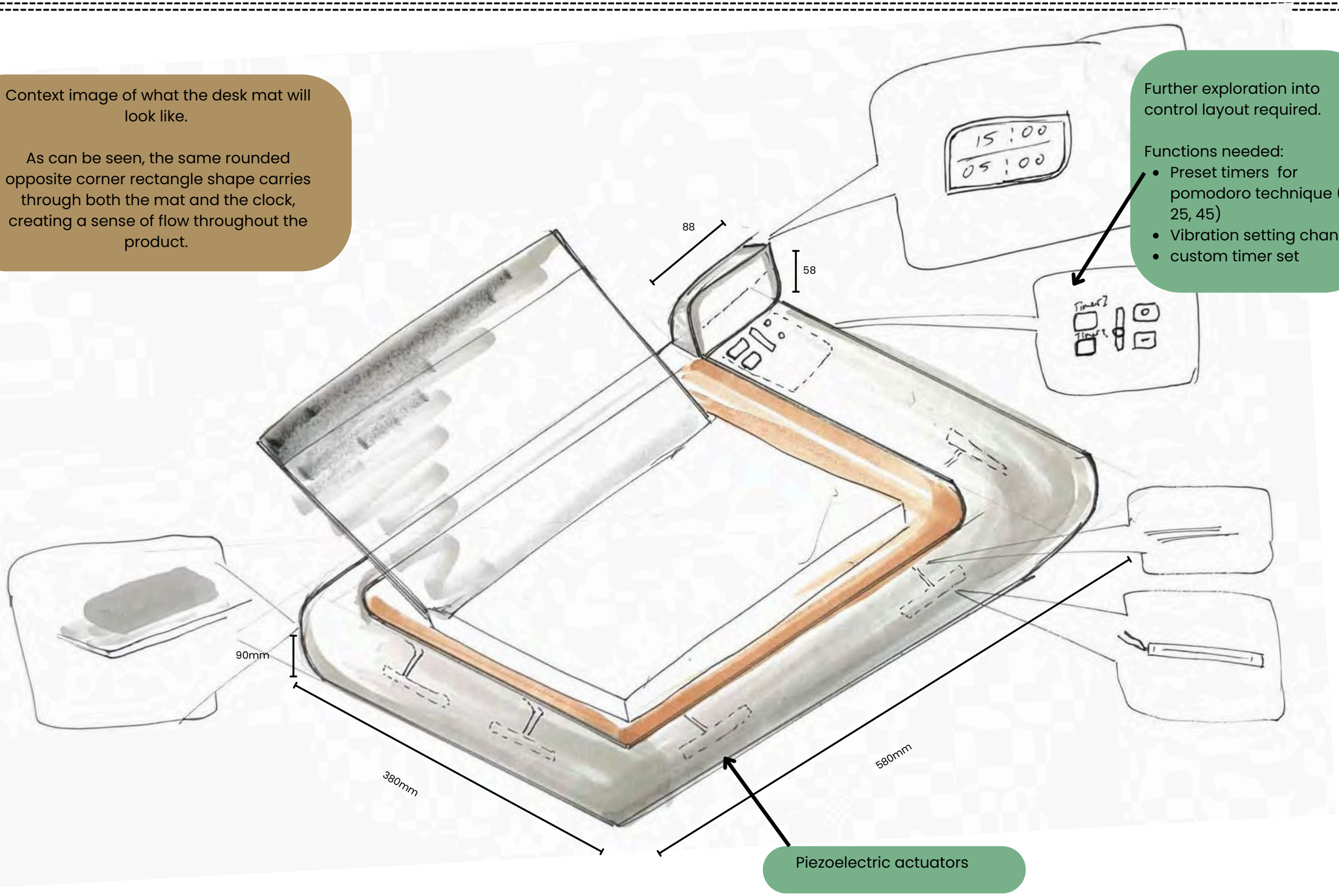
A few explorations of corner shaping for the final design.

This one is the neatest and the desired effect, however the one below is likely to be the outcome of the design due to manufacturing and technology constraints.

Week 12 | Updated form sketch of the final design direction | including laptop for context

Context image of what the desk mat will look like.

As can be seen, the same rounded opposite corner rectangle shape carries through both the mat and the clock, creating a sense of flow throughout the product.

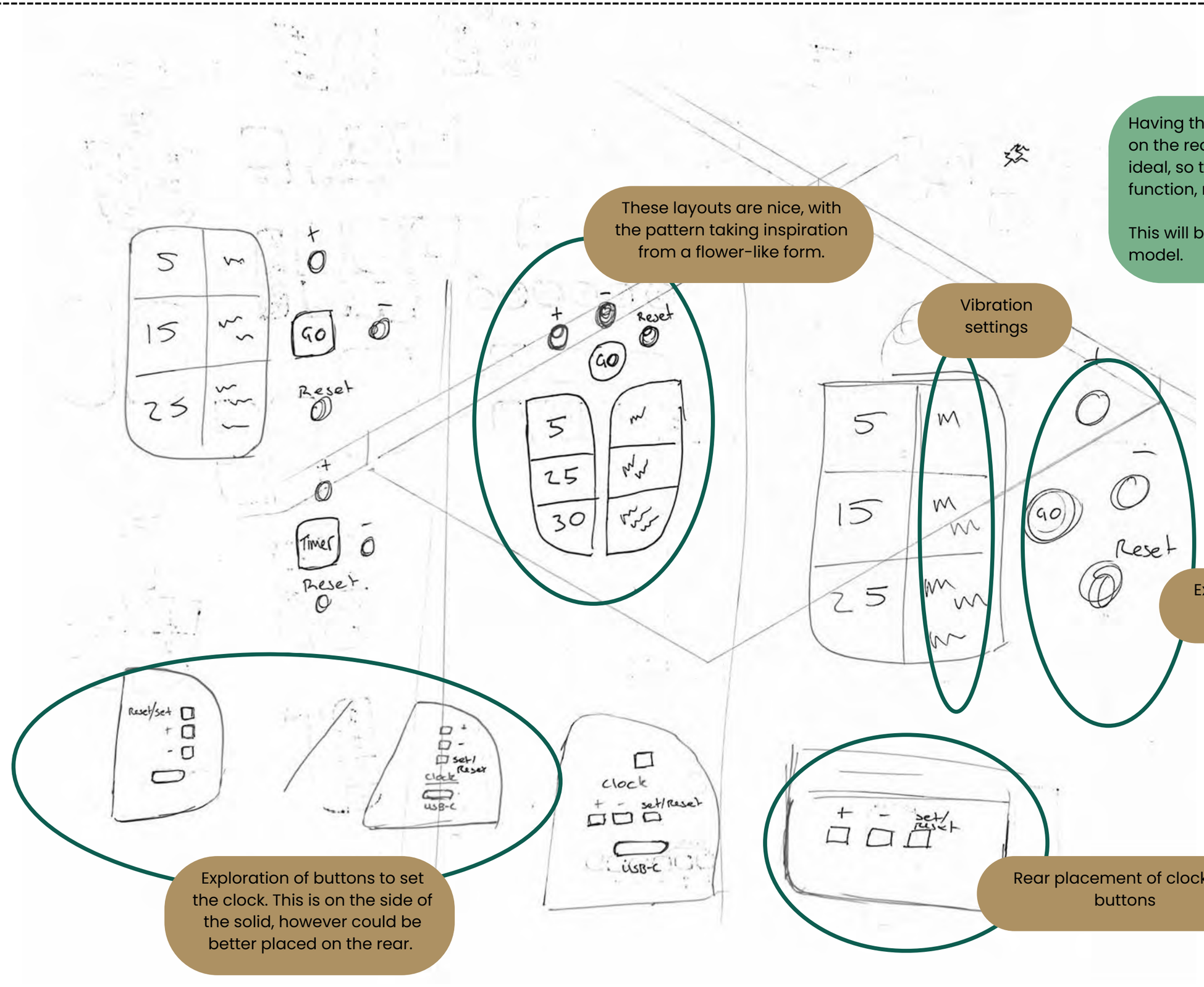


Further exploration into control layout required.

Functions needed:

- Preset timers for pomodoro technique (5, 25, 45)
- Vibration setting change
- custom timer set

Piezoelectric actuators



These layouts are nice, with the pattern taking inspiration from a flower-like form.

Having the clock set buttons on the rear of the solid is ideal, so that they are just a function, not a feature.

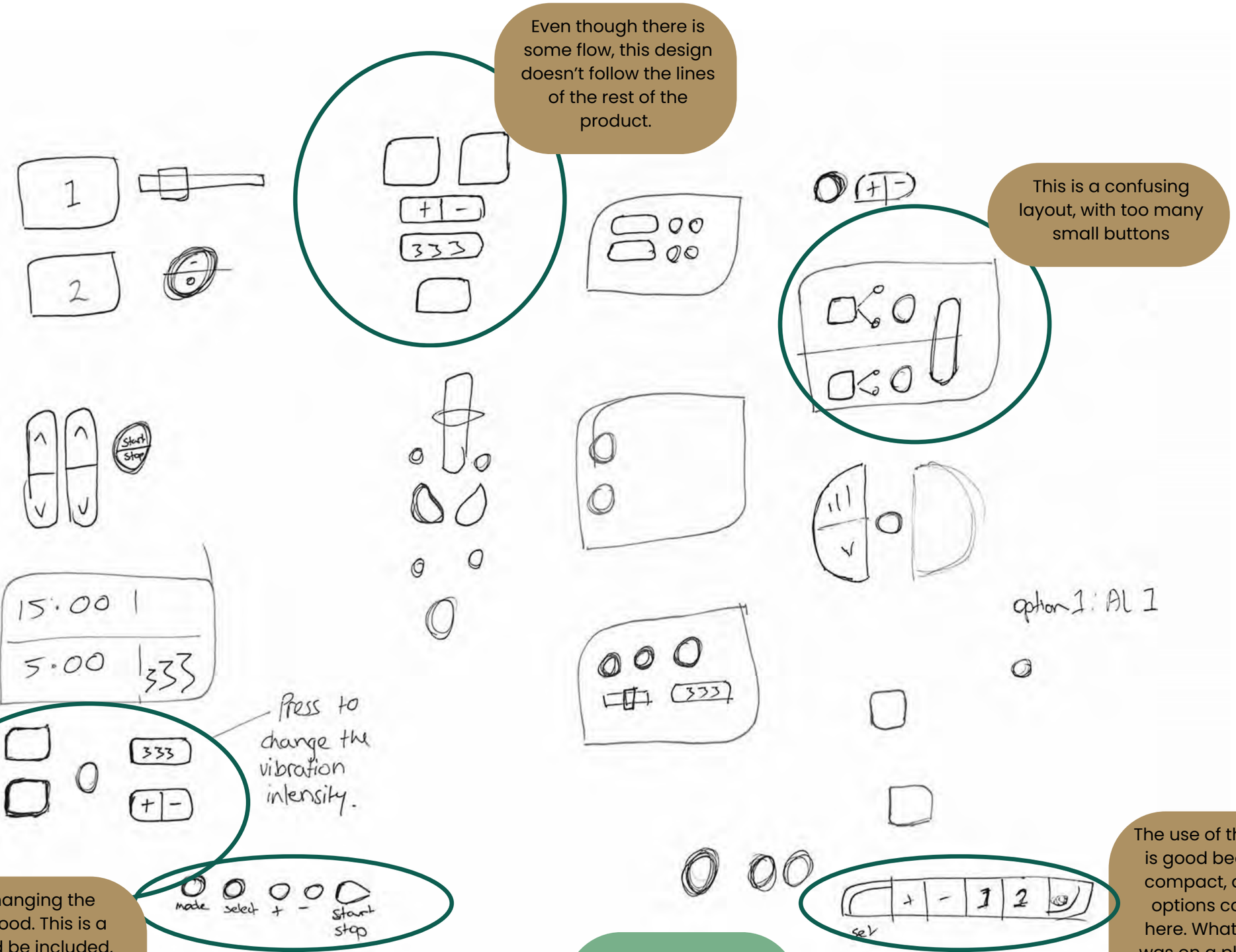
This will be done in the final model.

Vibration settings

Exploring the custom setting buttons for the timer.

Exploration of buttons to set the clock. This is on the side of the solid, however could be better placed on the rear.

Rear placement of clock set buttons



Even though there is some flow, this design doesn't follow the lines of the rest of the product.

This is a confusing layout, with too many small buttons

The exploration of changing the vibration intensity is good. This is a key feature that should be included, as it allows for customisation for each user.

This long button is attractive, and should be further explored in the design of the buttons.

The use of the bar here is good because it is compact, and many options can be put here. What if the text was on a plate, rather than the buttons itself?

Week 13 | Design development | button layout no.2

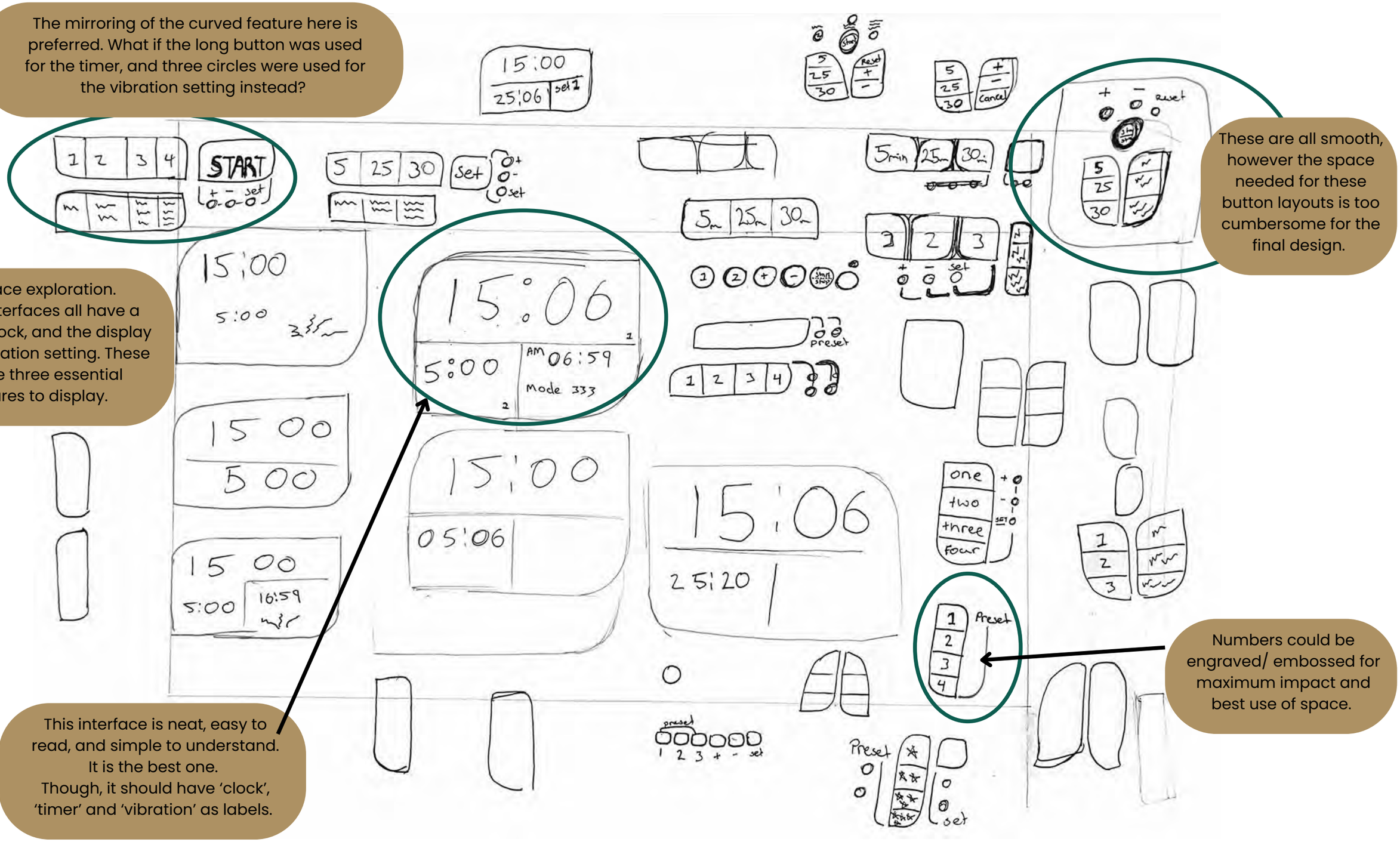
The mirroring of the curved feature here is preferred. What if the long button was used for the timer, and three circles were used for the vibration setting instead?

Interface exploration.
These interfaces all have a timer, a clock, and the display of the vibration setting. These are the three essential features to display.

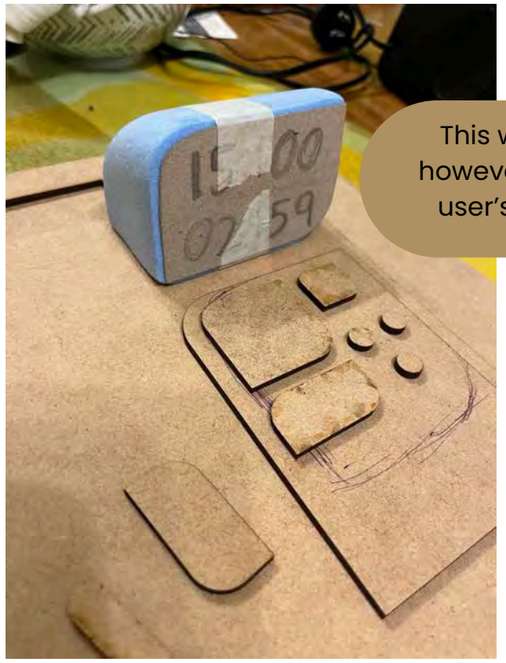
These are all smooth, however the space needed for these button layouts is too cumbersome for the final design.

This interface is neat, easy to read, and simple to understand.
It is the best one.
Though, it should have ‘clock’, ‘timer’ and ‘vibration’ as labels.

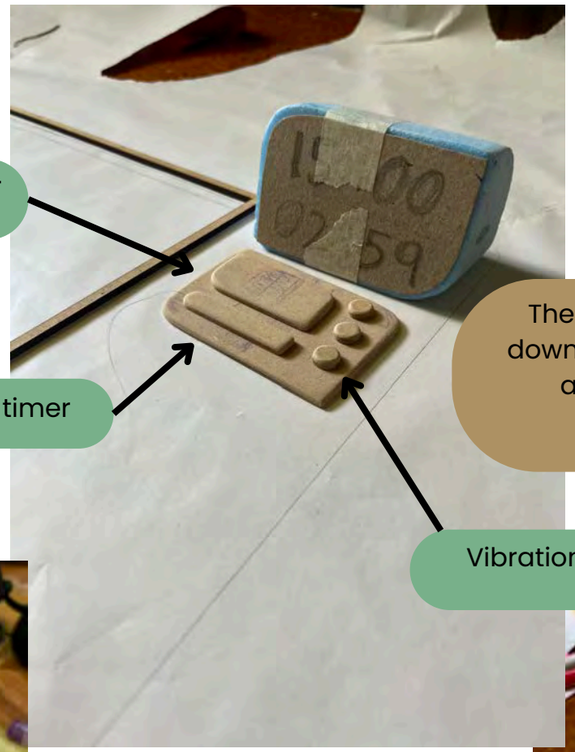
Numbers could be engraved/ embossed for maximum impact and best use of space.



Week 13 | Physical prototyping | control panel button layout



This was well spread out, however too large, reducing user's space on the mat.

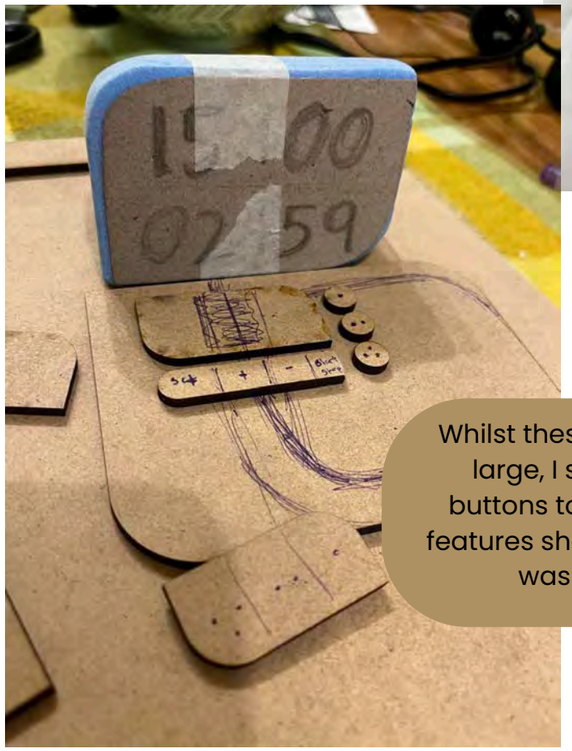


Preset timer

Custom set timer

The buttons were sanded down, made the correct size, and feature location confirmed.

Vibration set

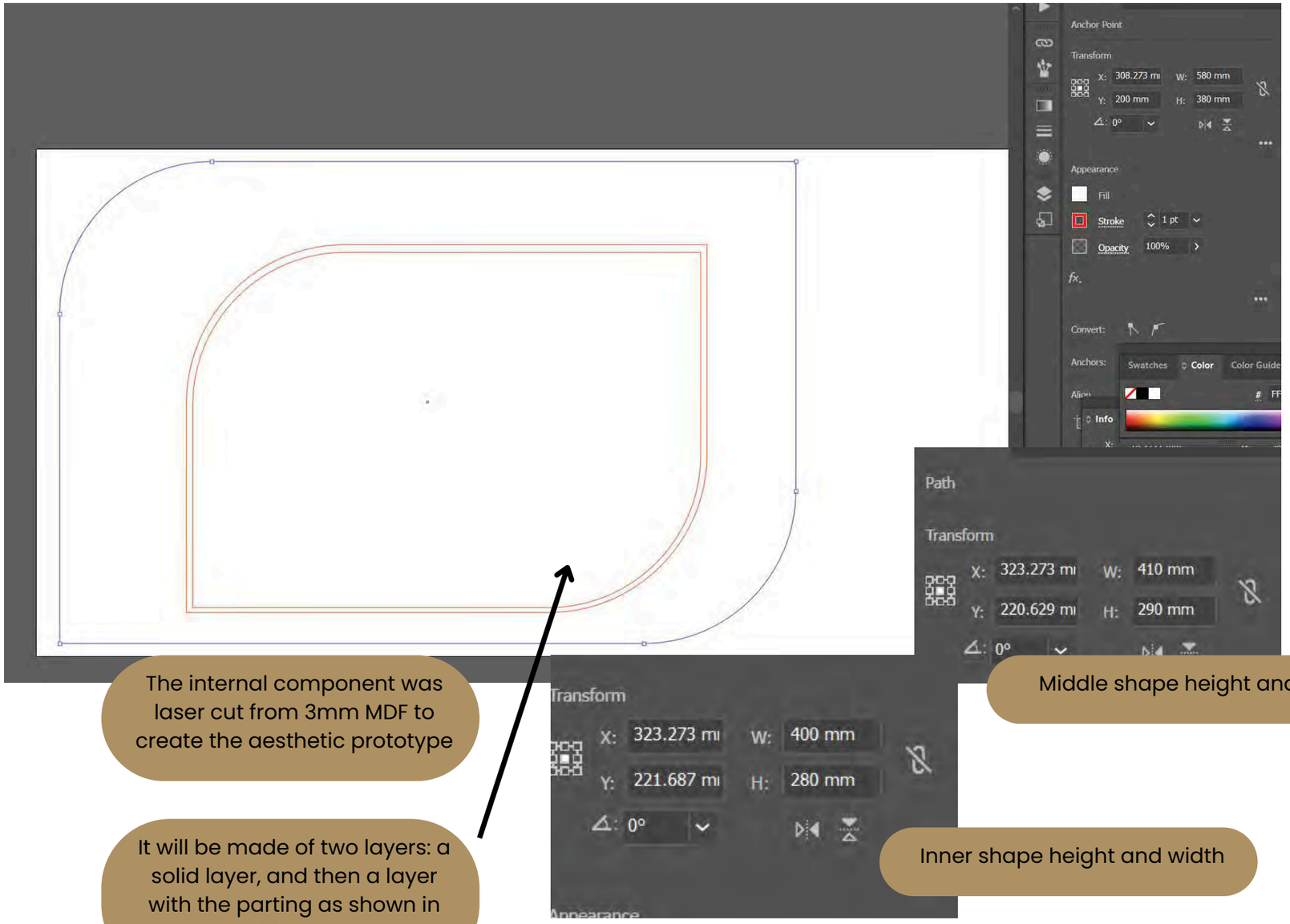


Whilst these pieces were too large, I sketched on the buttons to figure out which features should be where. This was successful.

Using the laser cut buttons, the layout was refined further.

This is a better representation of how the buttons will look on the final product.

Week 13 | Illustrator vector files for internal body of product, control panel and buttons

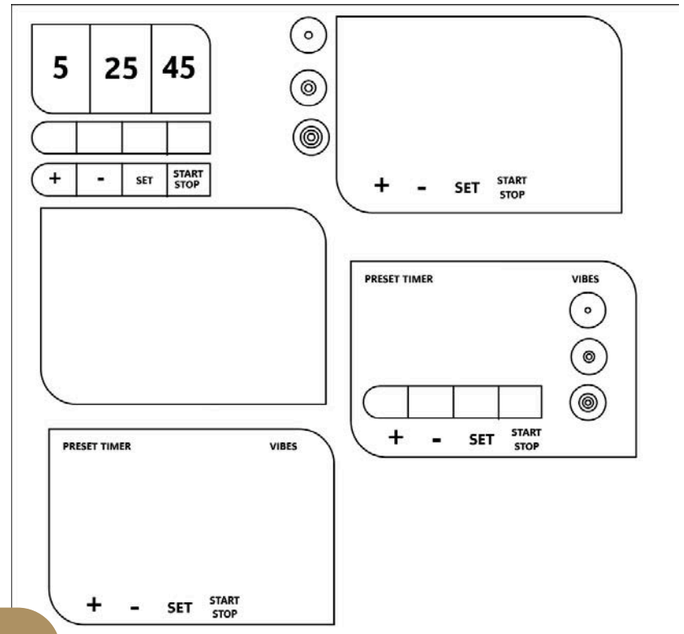


The internal component was laser cut from 3mm MDF to create the aesthetic prototype

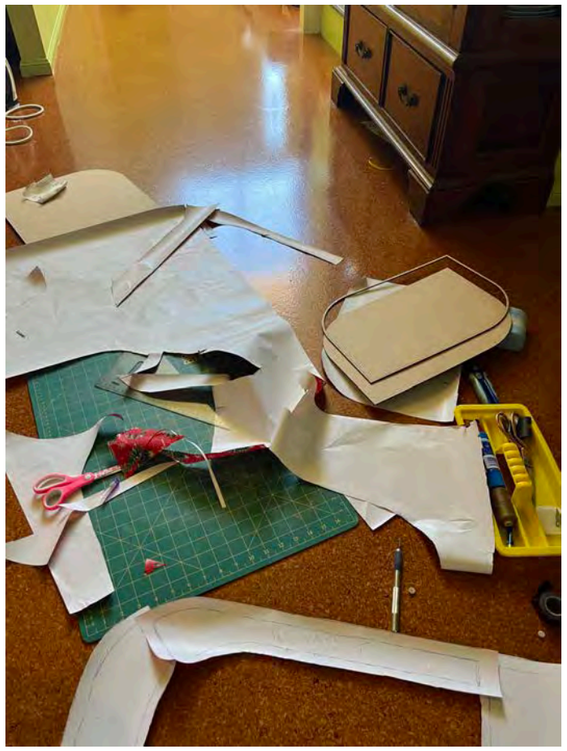
It will be made of two layers: a solid layer, and then a layer with the parting as shown in this image.

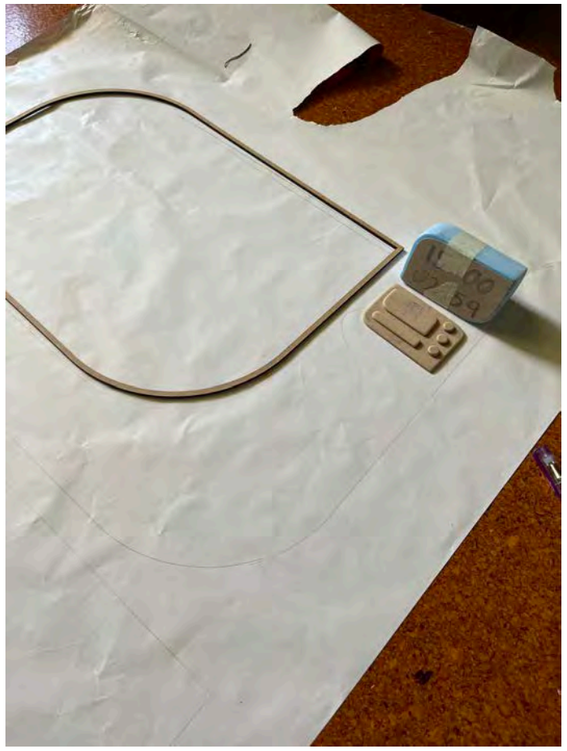
Middle shape height and width

Inner shape height and width



Vector file of the buttons and control panel. When viewed next to the shape of the mat, its clear that the same curved rectangle shape carries through all elements of the design.





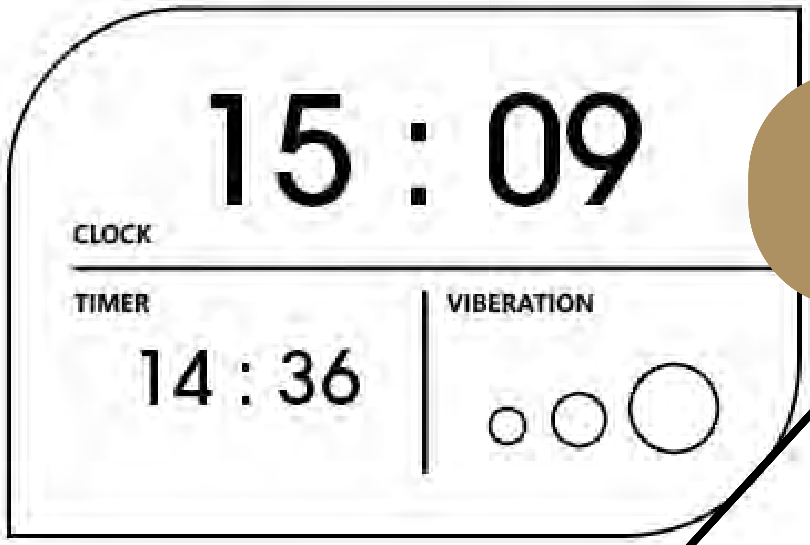
This was successful, and the pattern was then used to cut the pieces of material for the final construction.

Process of pattern making:

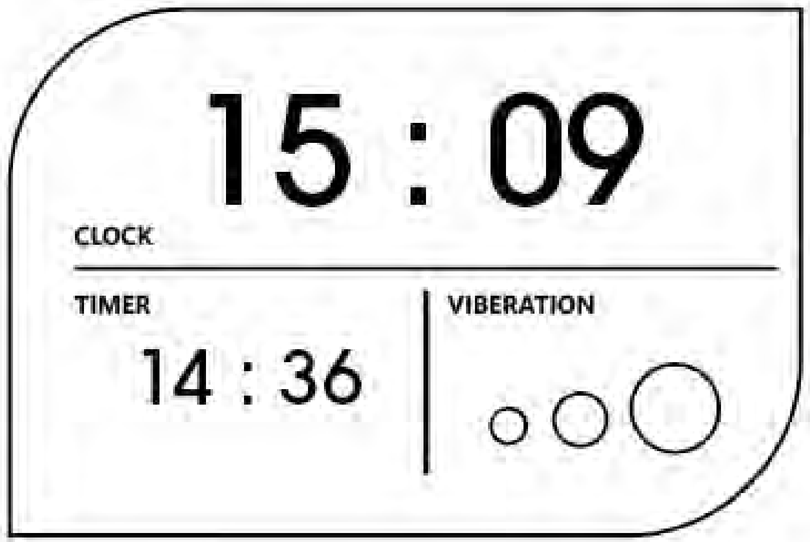
Using the laser cut MDF as a stencil, I created a pattern on wrapping paper for the faux suede cover of the mat.

A 1.5cm seam allowance was added on each piece.

Week 13 | Designing the digital screen interface



This is the first iteration in black and white. The vibration symbols should have some more differentiation than just size.



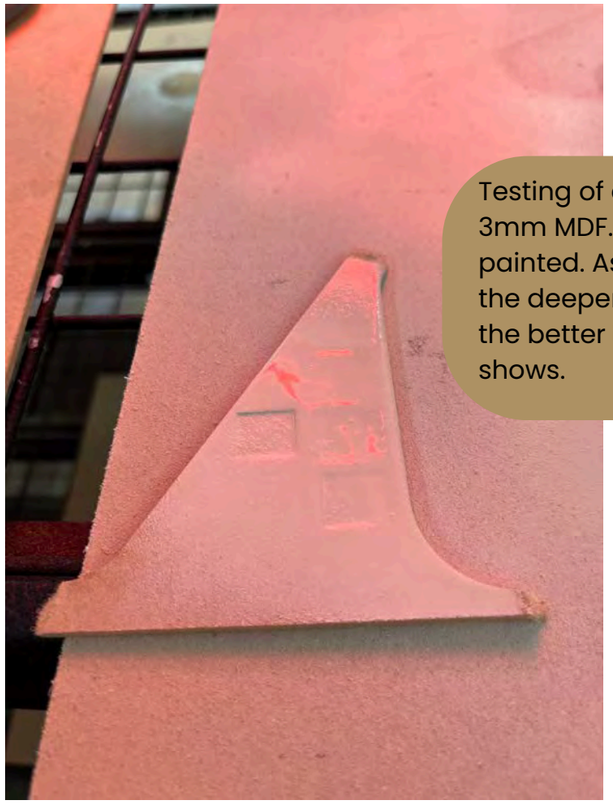
The final screen design. This uses traditional LCD font, cream light text, differentiation for the vibration symbols, as well as a black background for high contrast.

Whilst the green is nice, it may clash with other colours, materials and finishes. SO, the neutral cream was chosen instead.

LCD script was trialled. This would be easier to make a screen with this kind of font rather than curved font.

The screen background should be darker, closer to black.

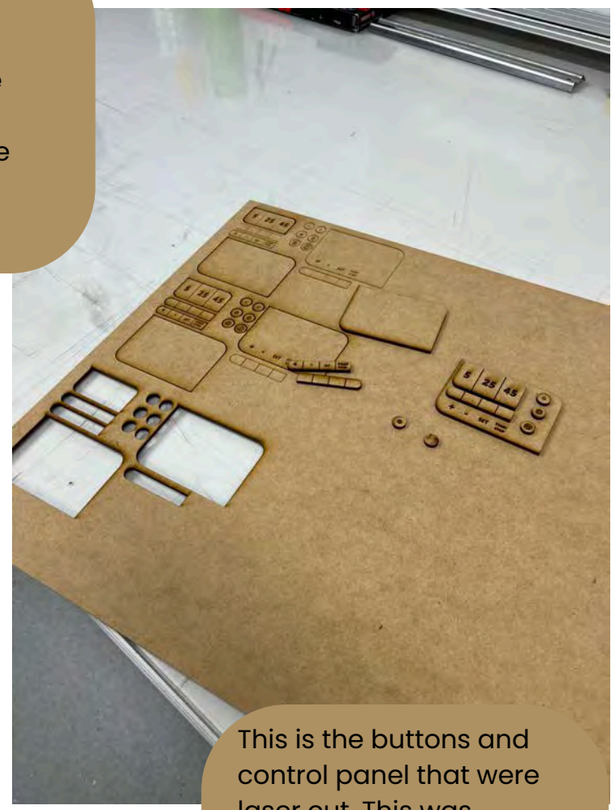
Week 13 | Fabrication and materials testing



Testing of engraving on 3mm MDF. This was then painted. As can be seen, the deeper the engraving the better the paint shows.

TPU additive manufacture prototype.

This process didn't work, as the pieces are too small for this machine. Therefore, they will be laser cut, sanded and painted instead.



This is the buttons and control panel that were laser cut. This was successful, and these are the pieces that are going to be used for the final.

Testing of hand-colouring the faux suede. This did not look clean, therefore the taupe colour will be used, with an engraved logo.

Testing of engraving the logo. This was successful, and will be used for the final.

To make the model, instead of additive fabrication, the blue foam was used.

The buttons and screen rim were double-sided taped to the solid body.

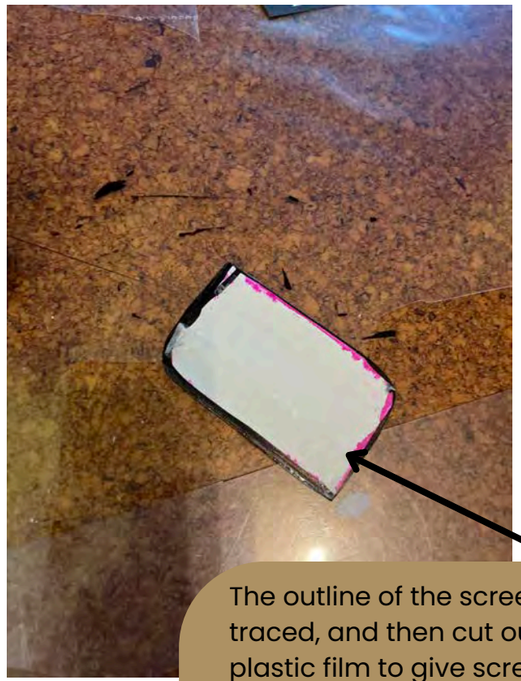
The model was finger painted with acrylic artists paint twice, then sanded back.

Process repeated twice.

Using super fine sandpaper, the model was sanded to give a matte plastic finish, eliminating most brush strokes.

The button control panel was laser cut then sanded down to round the edges. The labels ‘preset timer,’ ‘vibes,’ and custom setting symbols were engraved.

These would be embossed if mass manufactured.

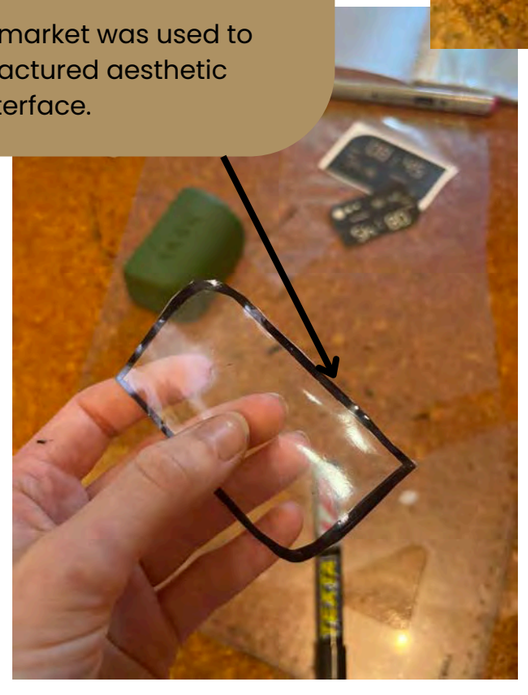


The outline of the screen cavity was traced, and then cut out of thin plastic film to give screen effect.

A permanent market was used to create manufactured aesthetic around the interface.

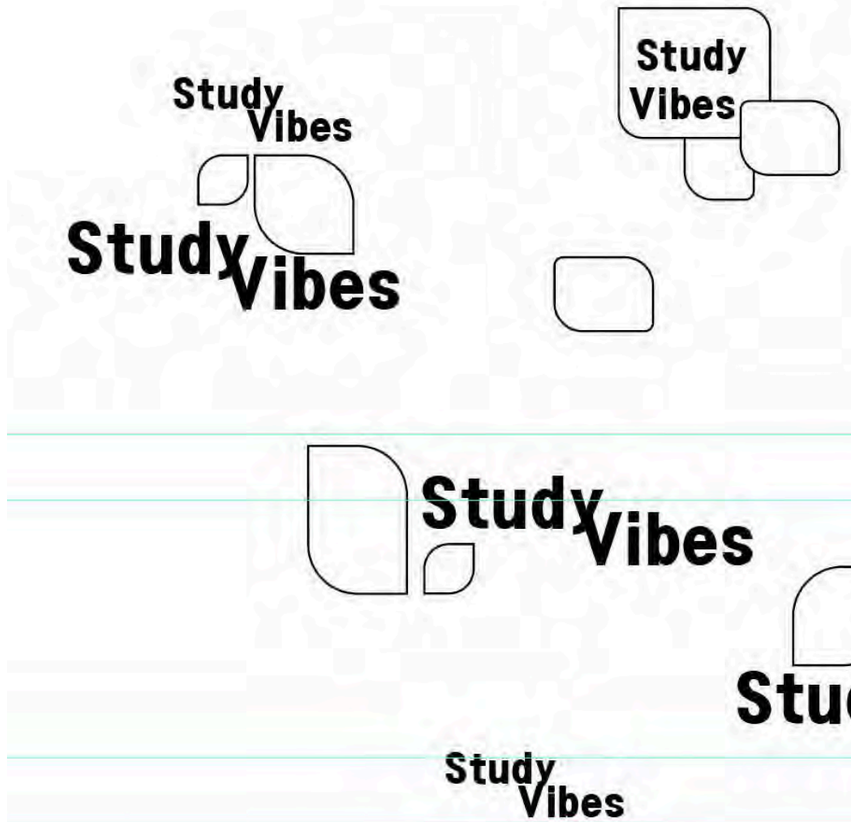
The screen interface was printed on photo paper and cut to shape.

The pain shown here is not finished. It was sanded and recoated three times to give smooth white aesthetic.



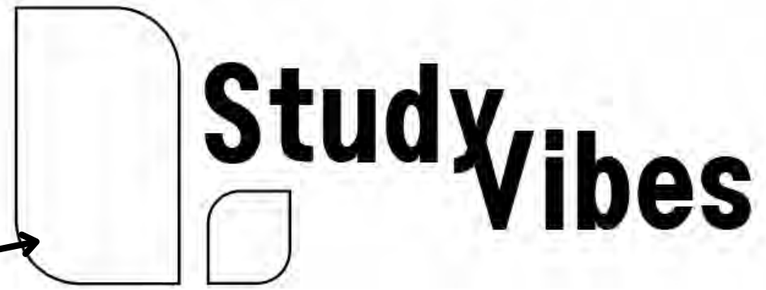
Final outcome is of high quality screen finish.

As the product is designed for people with ADHD to assist them with studying by using vibration sensation, the name 'StudyVibes' is both appropriate and catchy.



A few versions of the logo were tested, using the shapes that flow through the rest of the design. The rule of thirds was also applied to design the logo.

This is the final black and white version of the StudyVibes logo. It was chosen as it is balanced, has flow, and is easy to apply to the product in a number of ways.



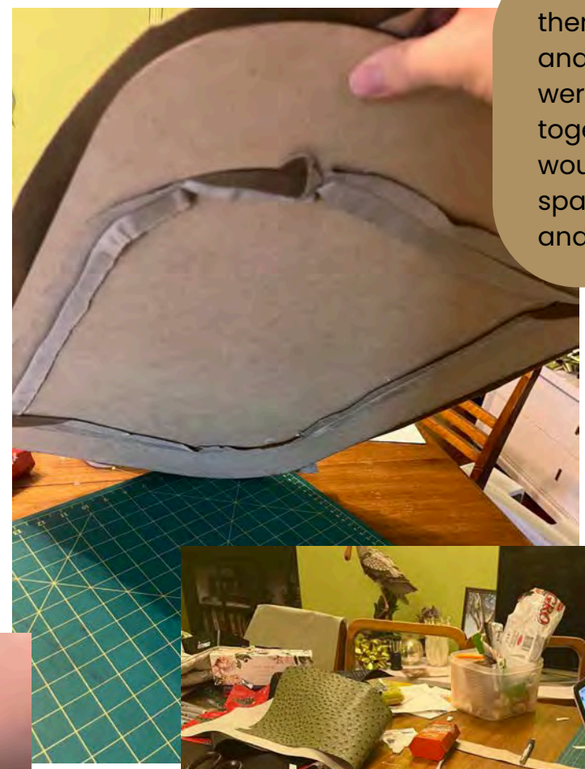
A coloured version is also included, incorporating the colours of the product.

In the final design, the logo was laser engraved into the faux suede at 60% speed and 100% power, creating a professional look and feel.

Week 13 | Fabrication of the final StudyVibes product

Here the final pattern checking is shown prior to cutting.

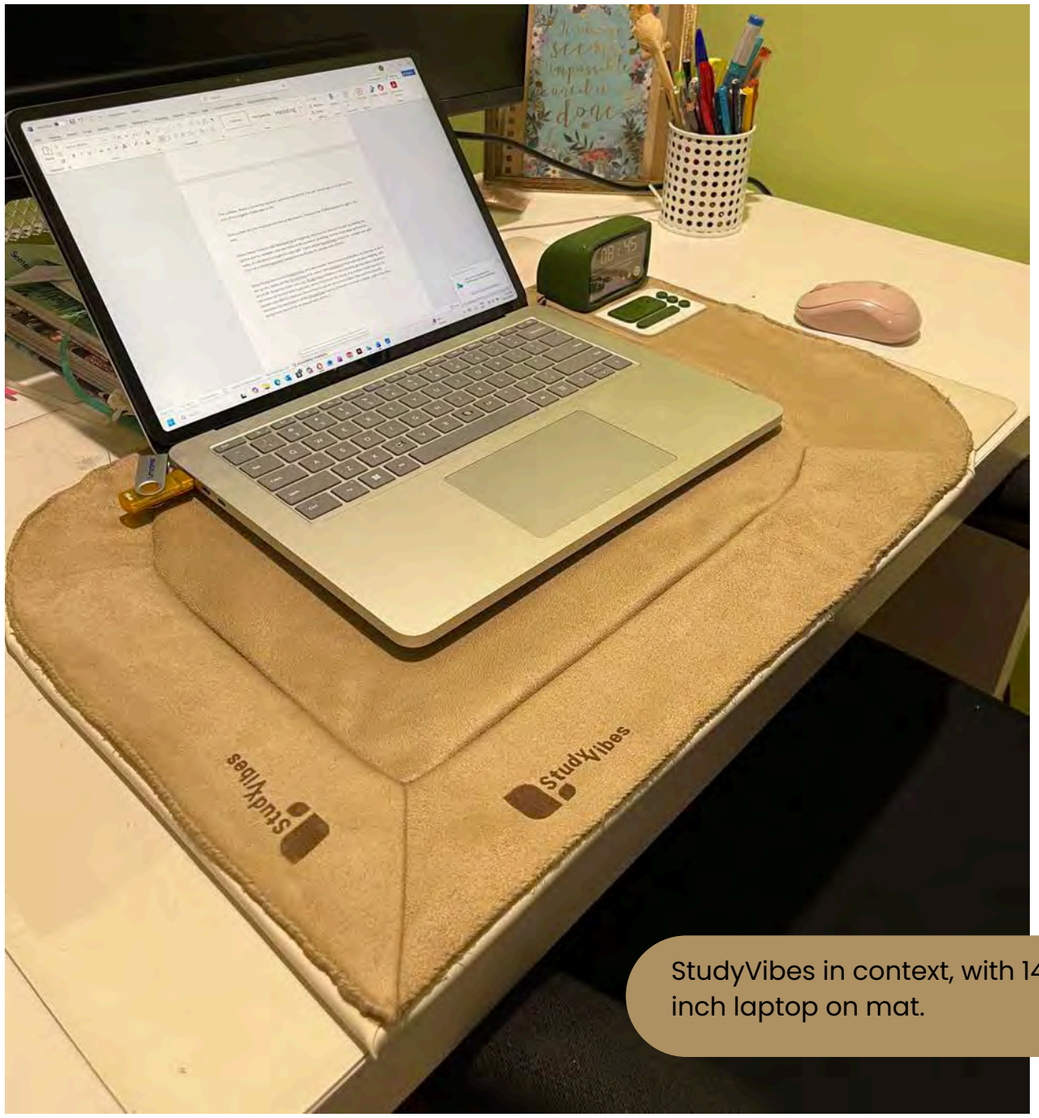
This is the machine-stitched top cover of the product.



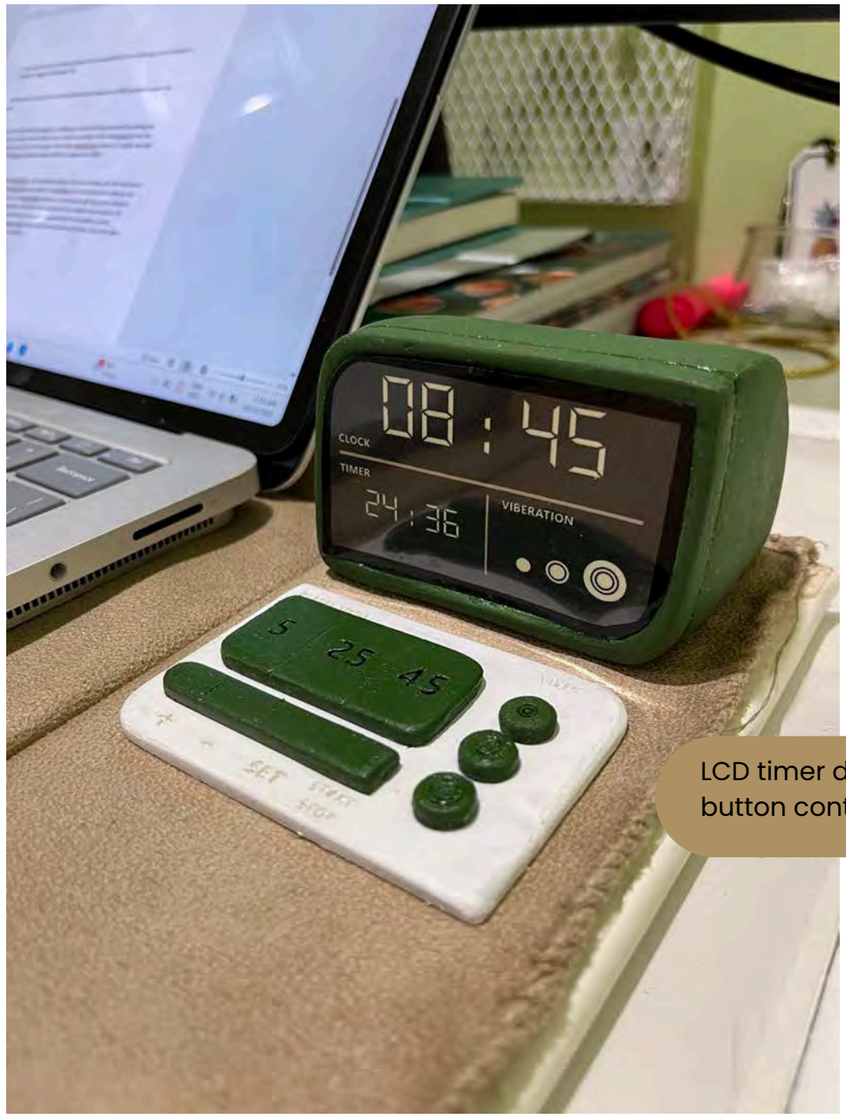
The seams of the cover were then set between the outer rim and the inner piece of MDF. They were double-sided taped together. If manufactured, this would be all one piece, with the space being used to house wires and foam.

Final assembly shown. A white vinyl bottom has been used as it is non-slip. This would be made of vinyl-covered rubber if manufactured.

Week 14 | Final StudyVibes prototypes images

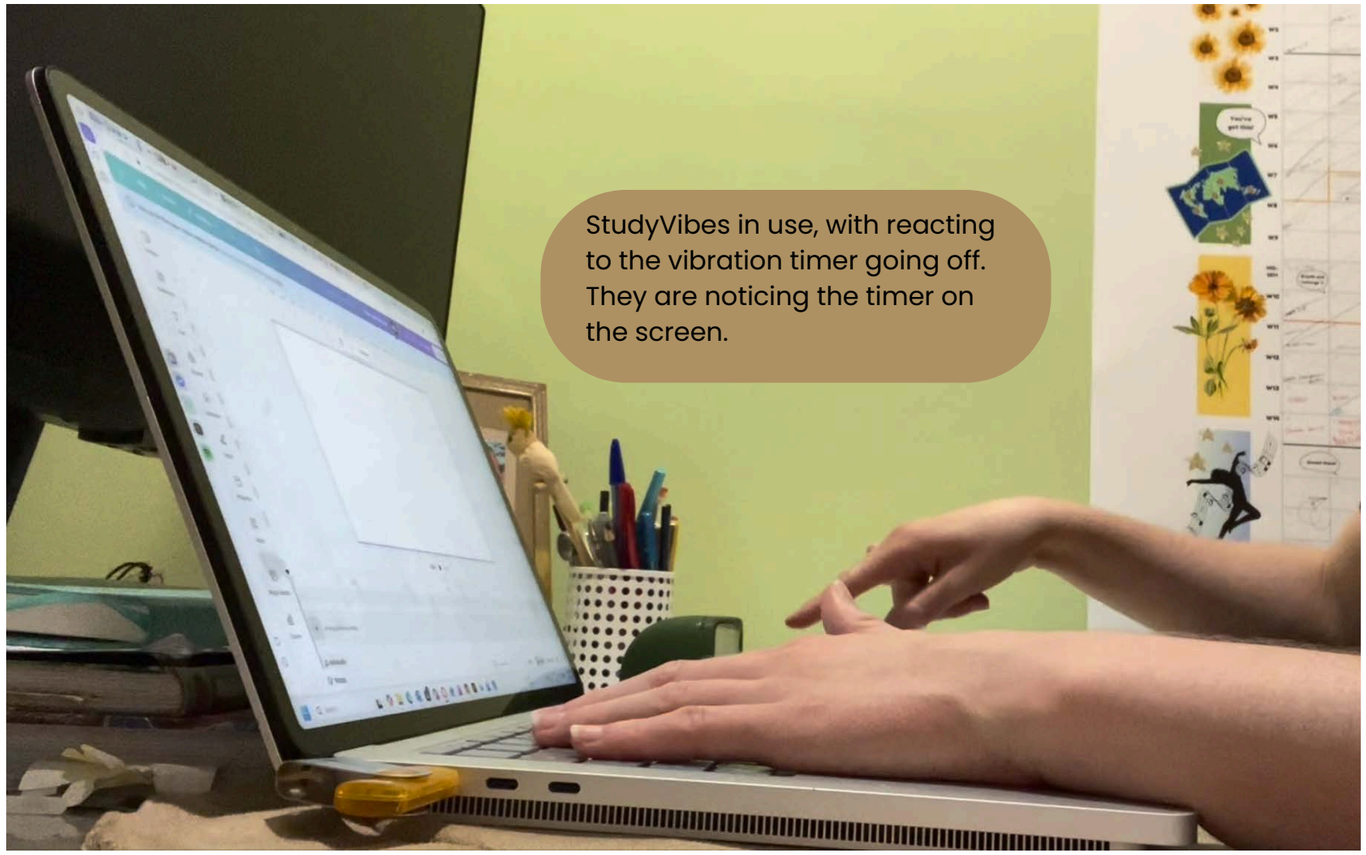


StudyVibes in context, with 14 inch laptop on mat.

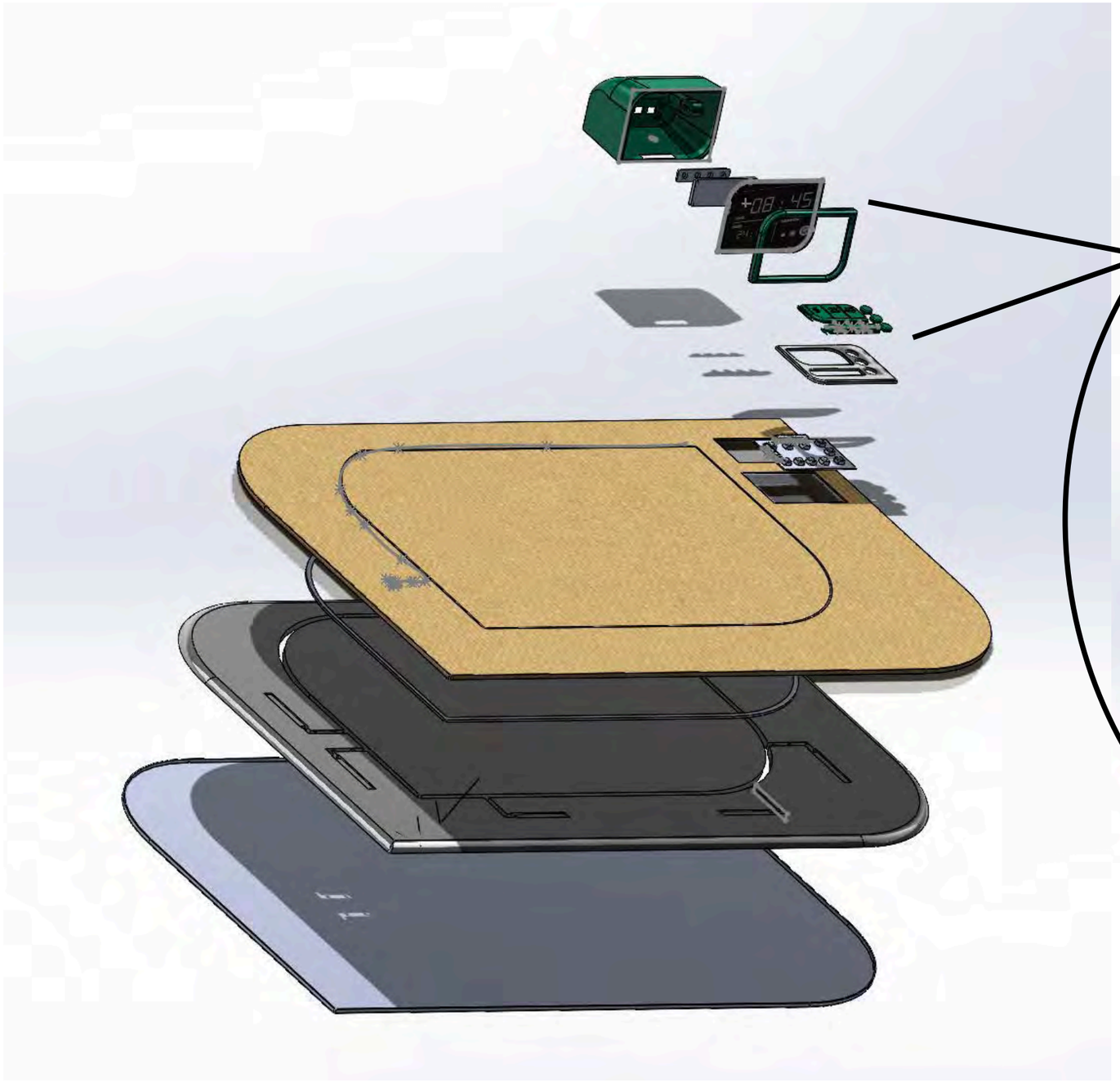


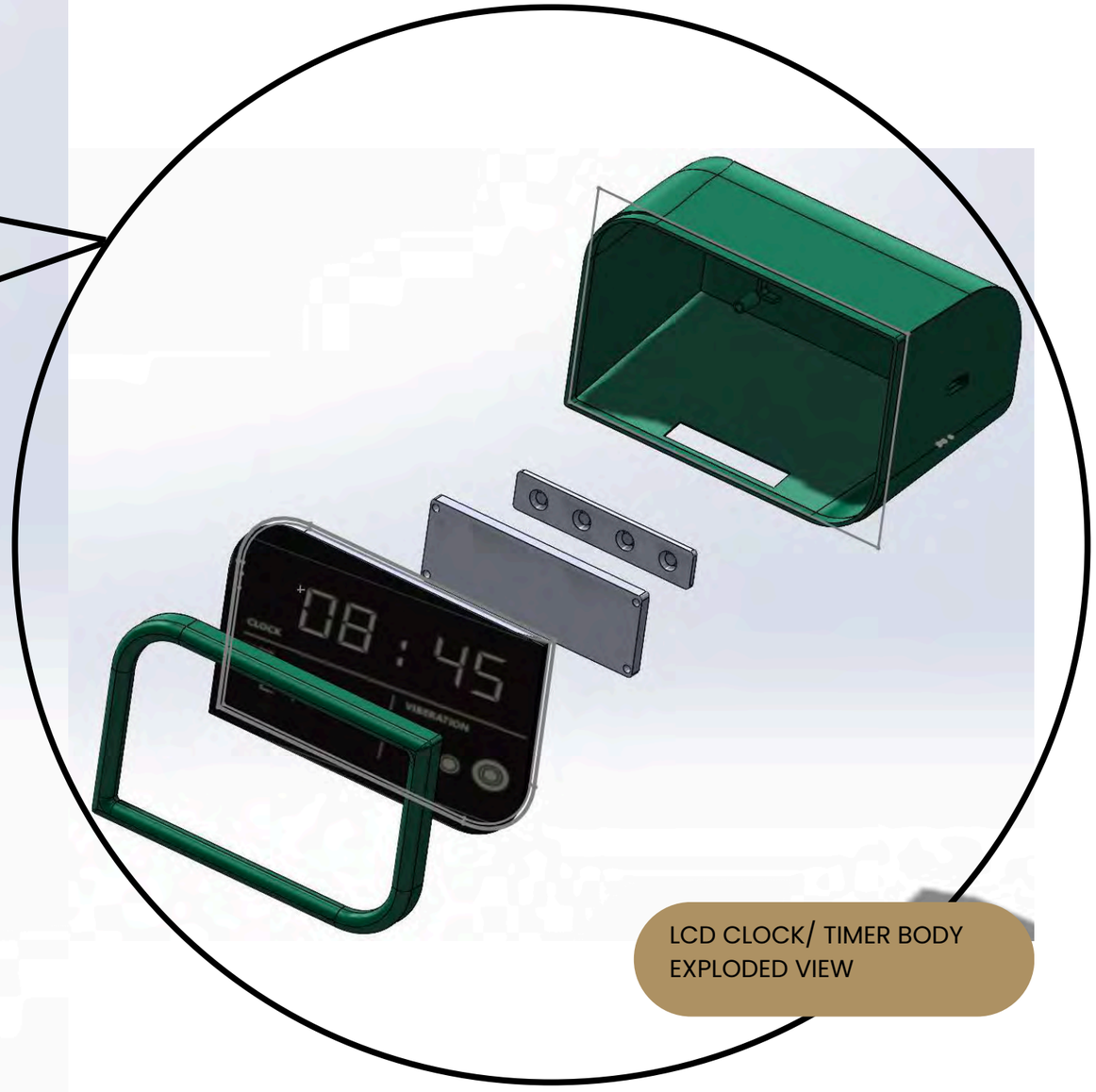
LCD timer display and vibration button control panel

StudyVibes in use, with user setting the timer.

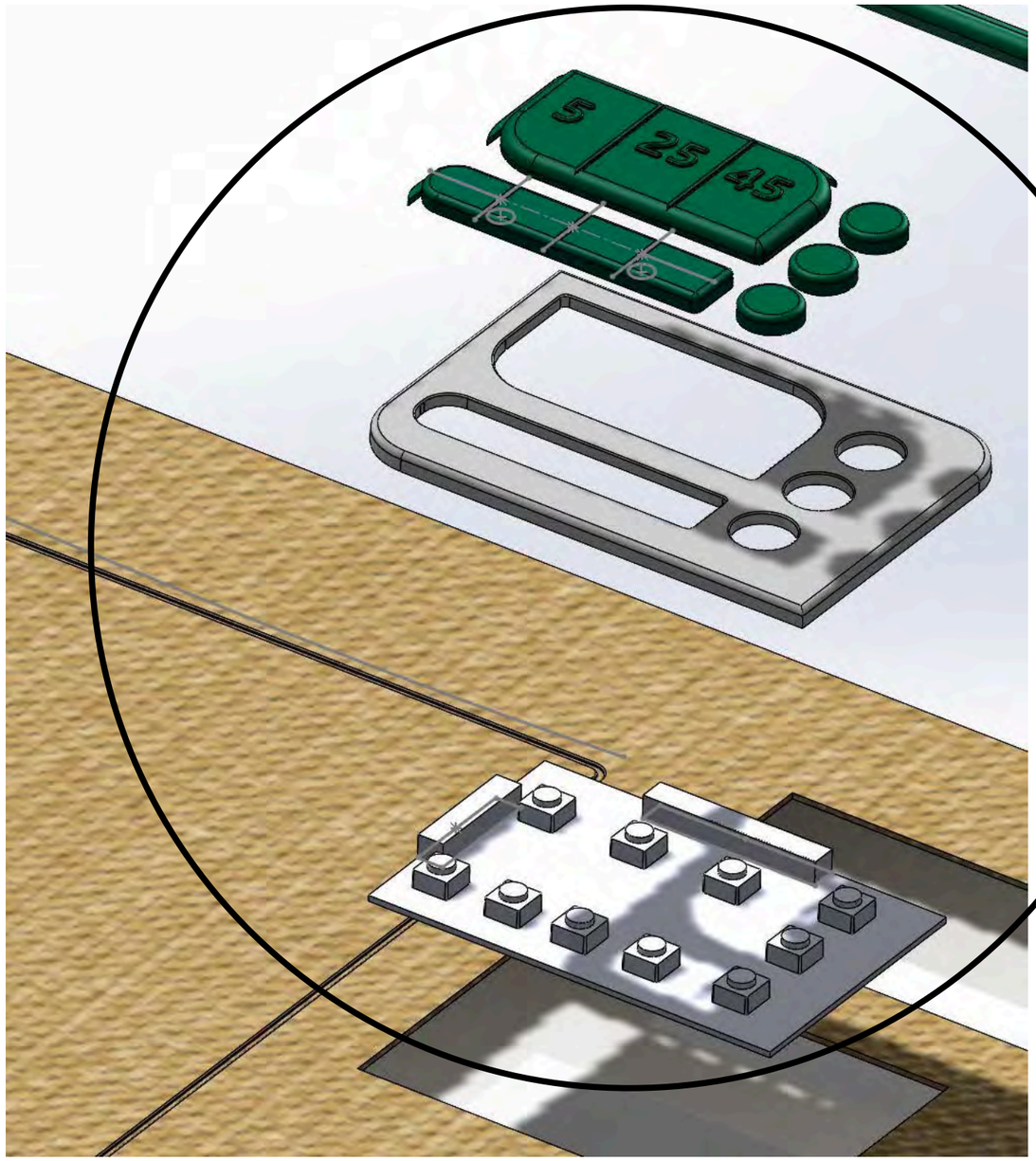


StudyVibes in use, with reacting to the vibration timer going off. They are noticing the timer on the screen.

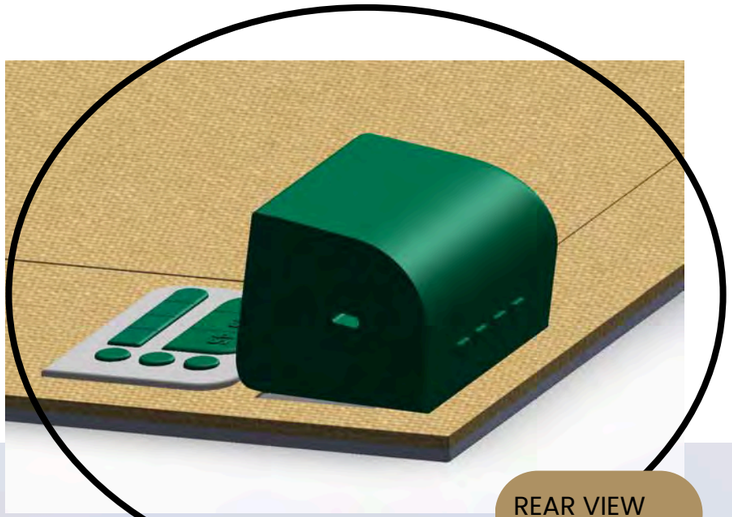




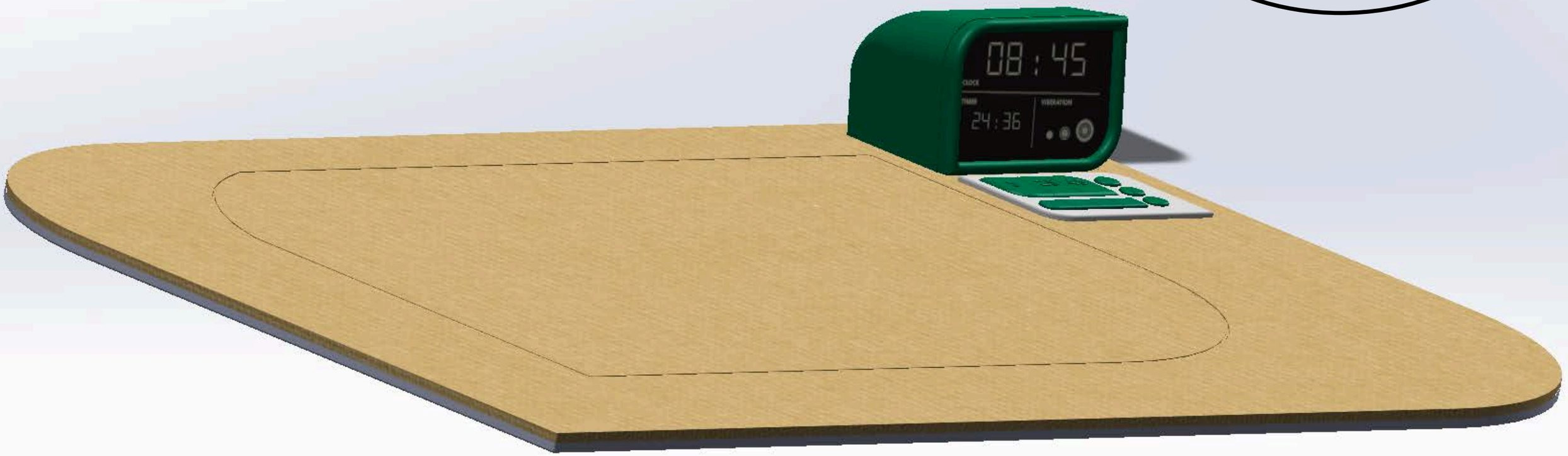
LCD CLOCK/ TIMER BODY
EXPLODED VIEW



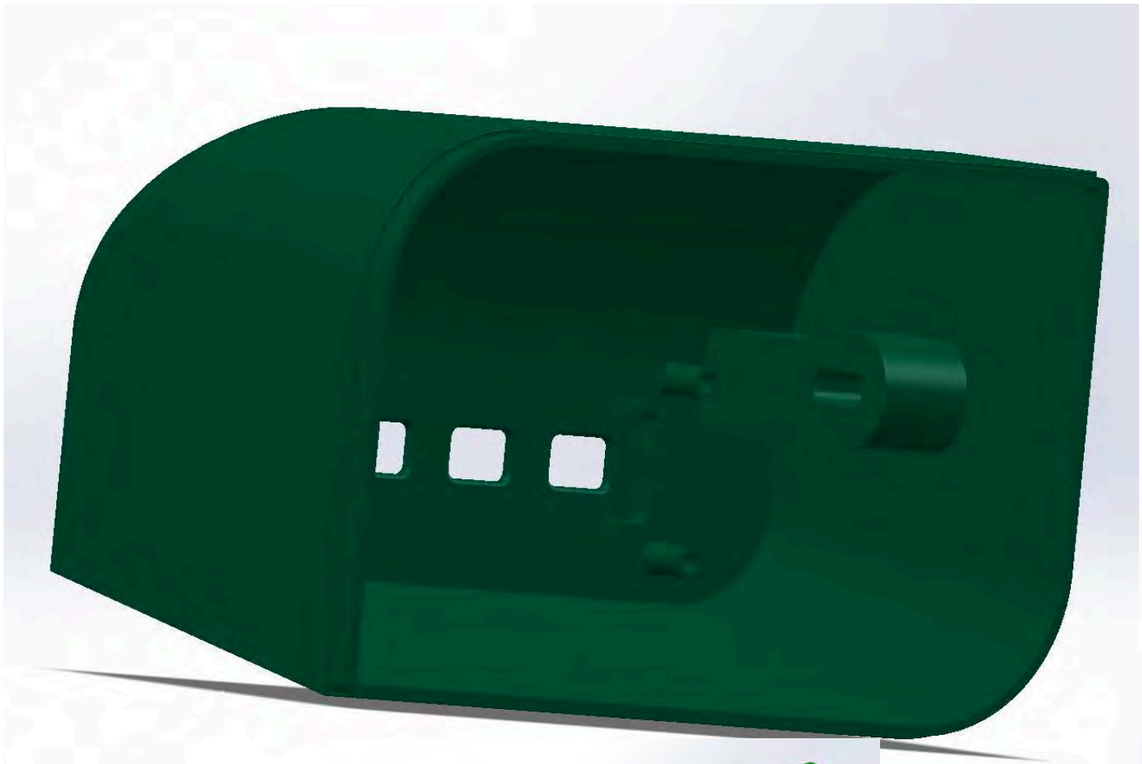
EXPLODED VIEW OF BUTTON CONTROL PANEL AND PCB



REAR VIEW

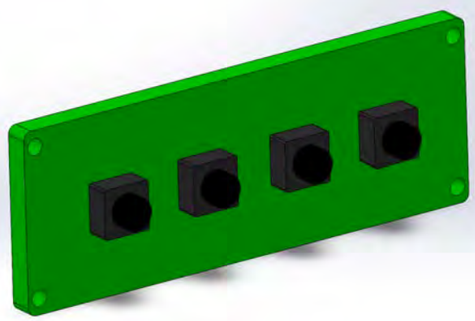


SOLIDWORKS ASSEMBLY OF STUDYVIBES

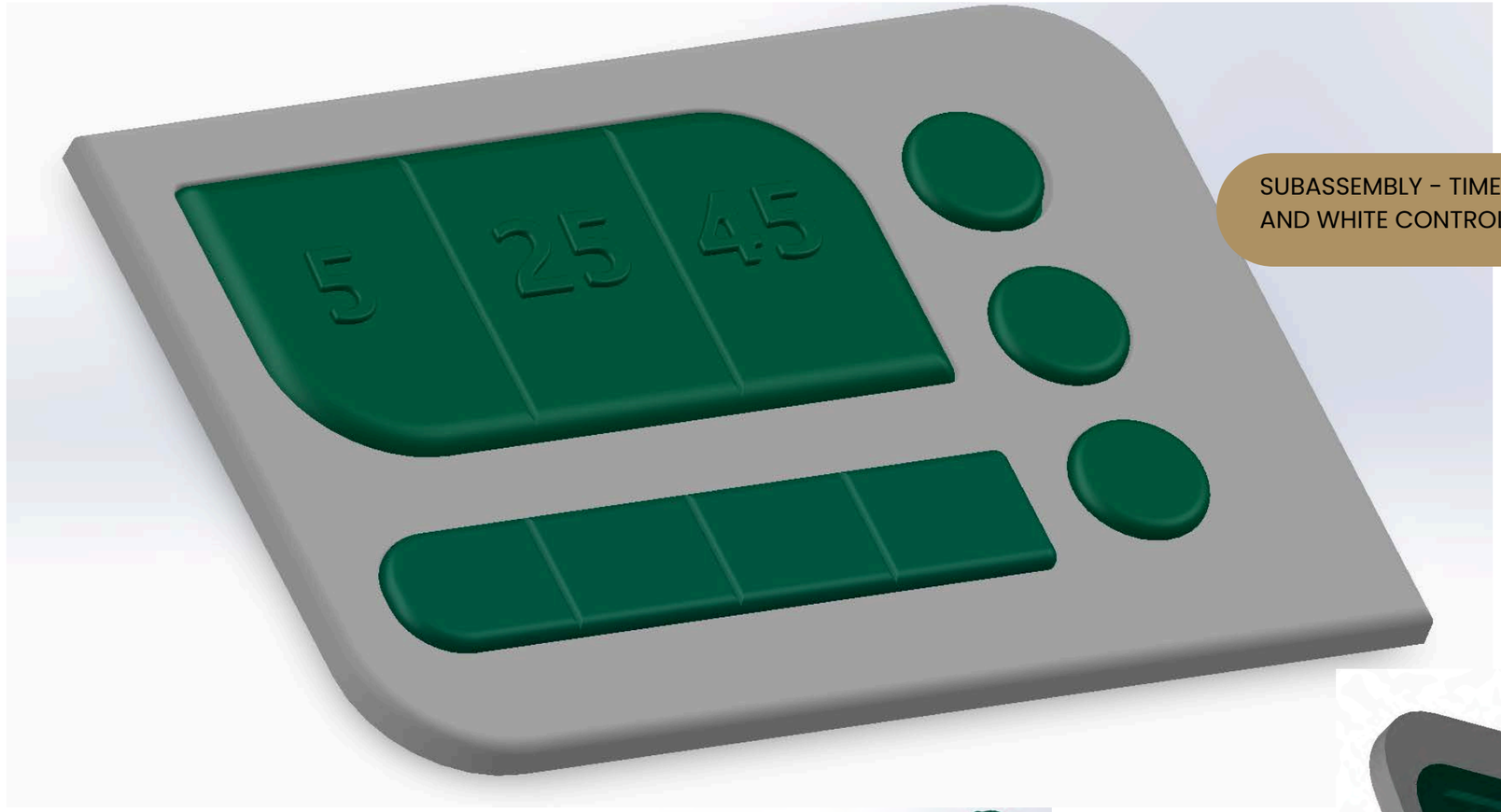


SHELL

PCB



BUTTONS

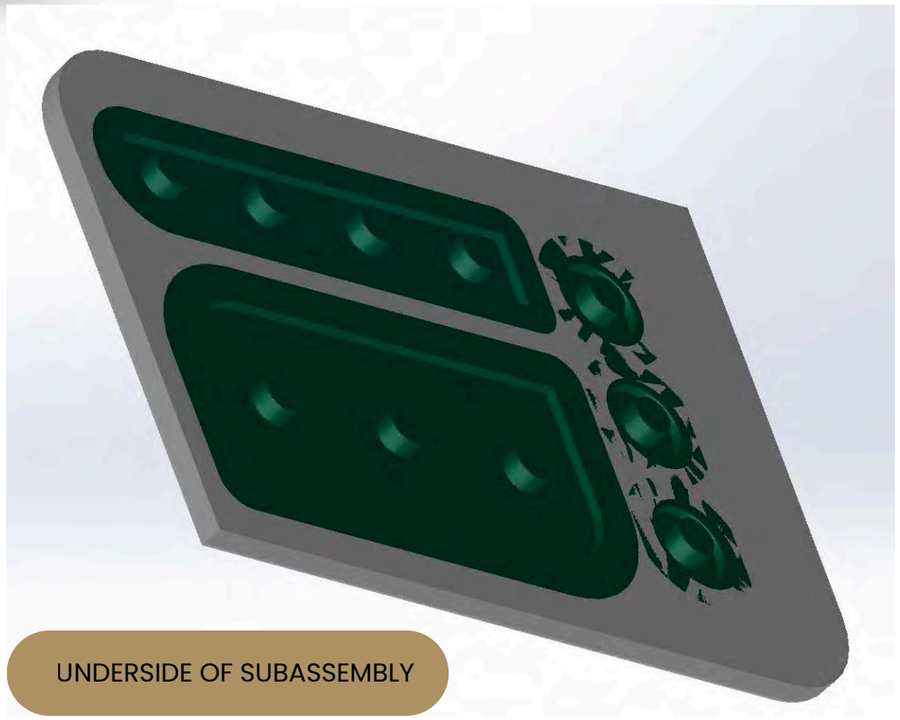


SUBASSEMBLY - TIMER BUTTONS AND WHITE CONTROL PANEL

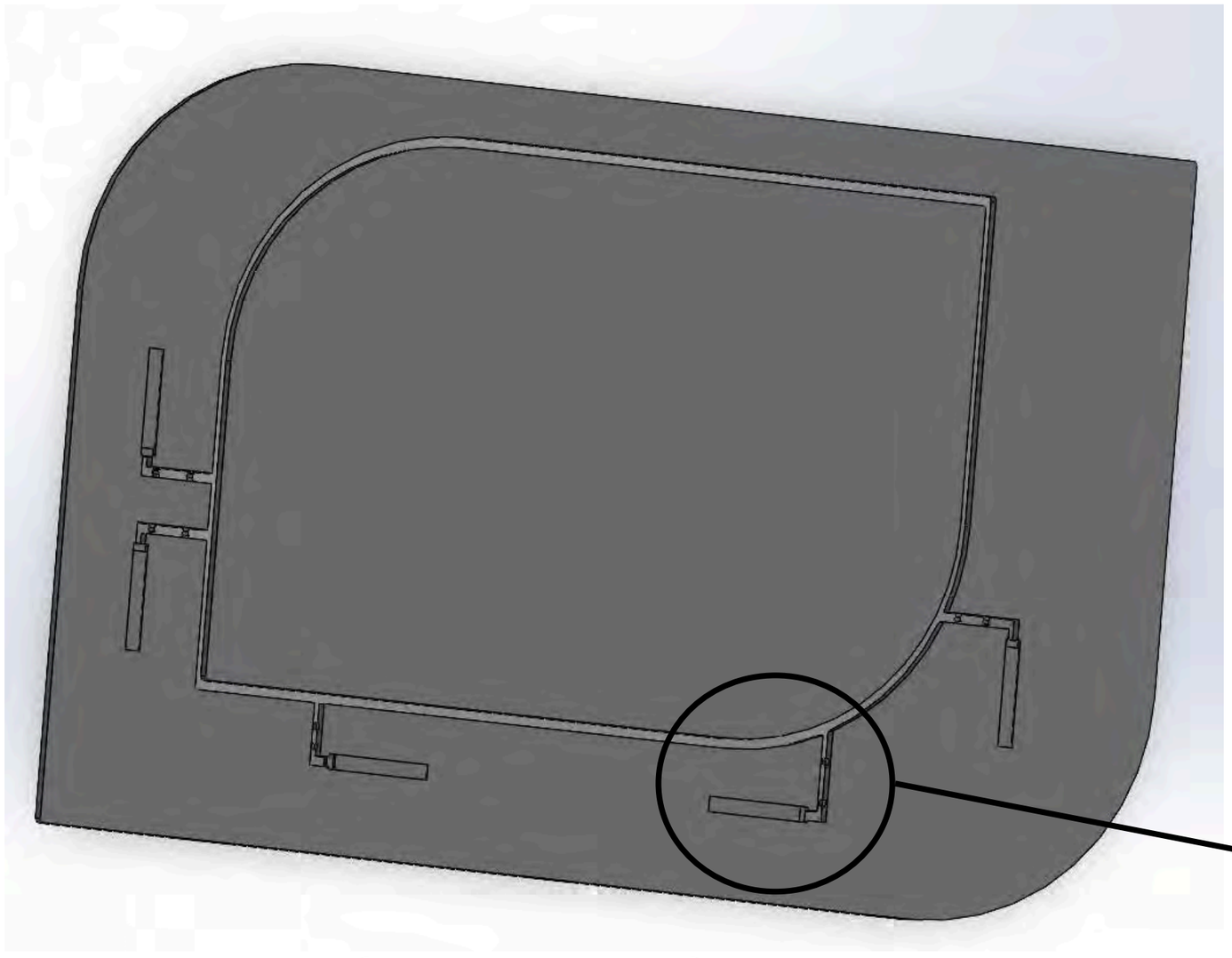
PRESET TIMER BUTTONS

CUSTOM SET BUTTONS

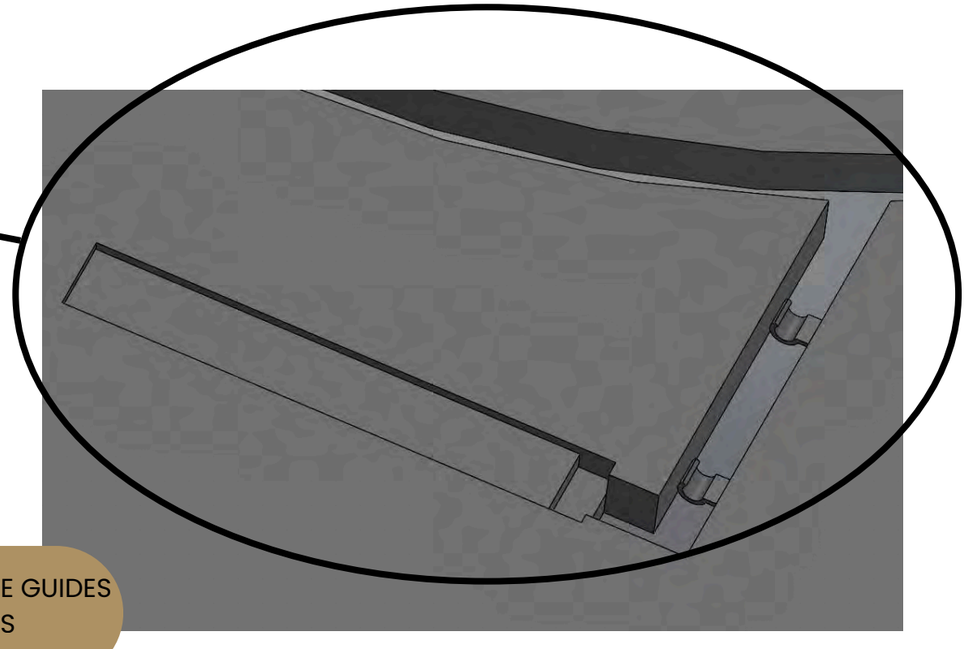
VIBRATION SETTING BUTTONS



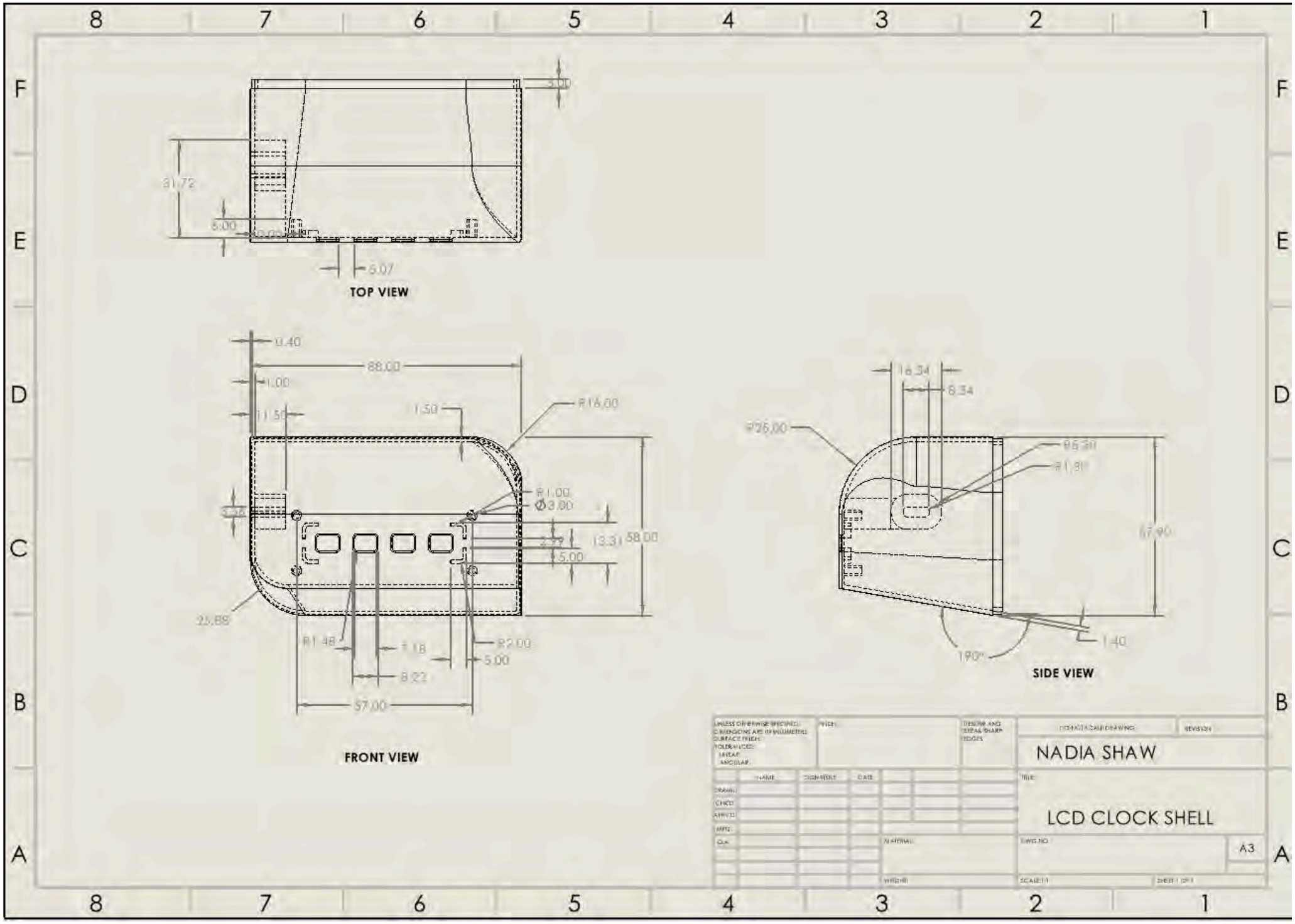
UNDERSIDE OF SUBASSEMBLY



INTERNAL LEAF COMPONENT



CLOSE UP VIEW OF WIRE GUIDES
INTERNAL COMPONENTS


8
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E
D
C
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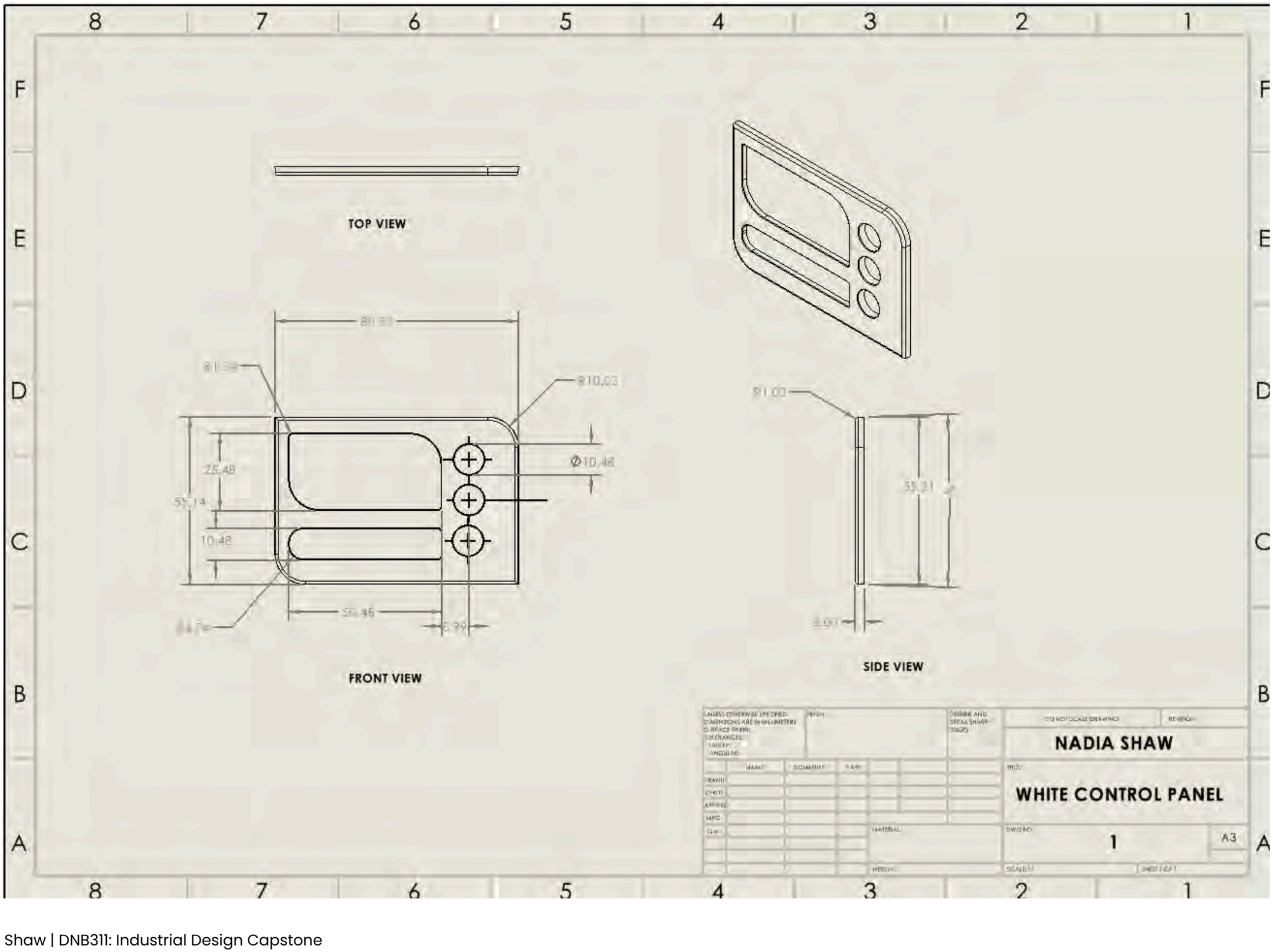
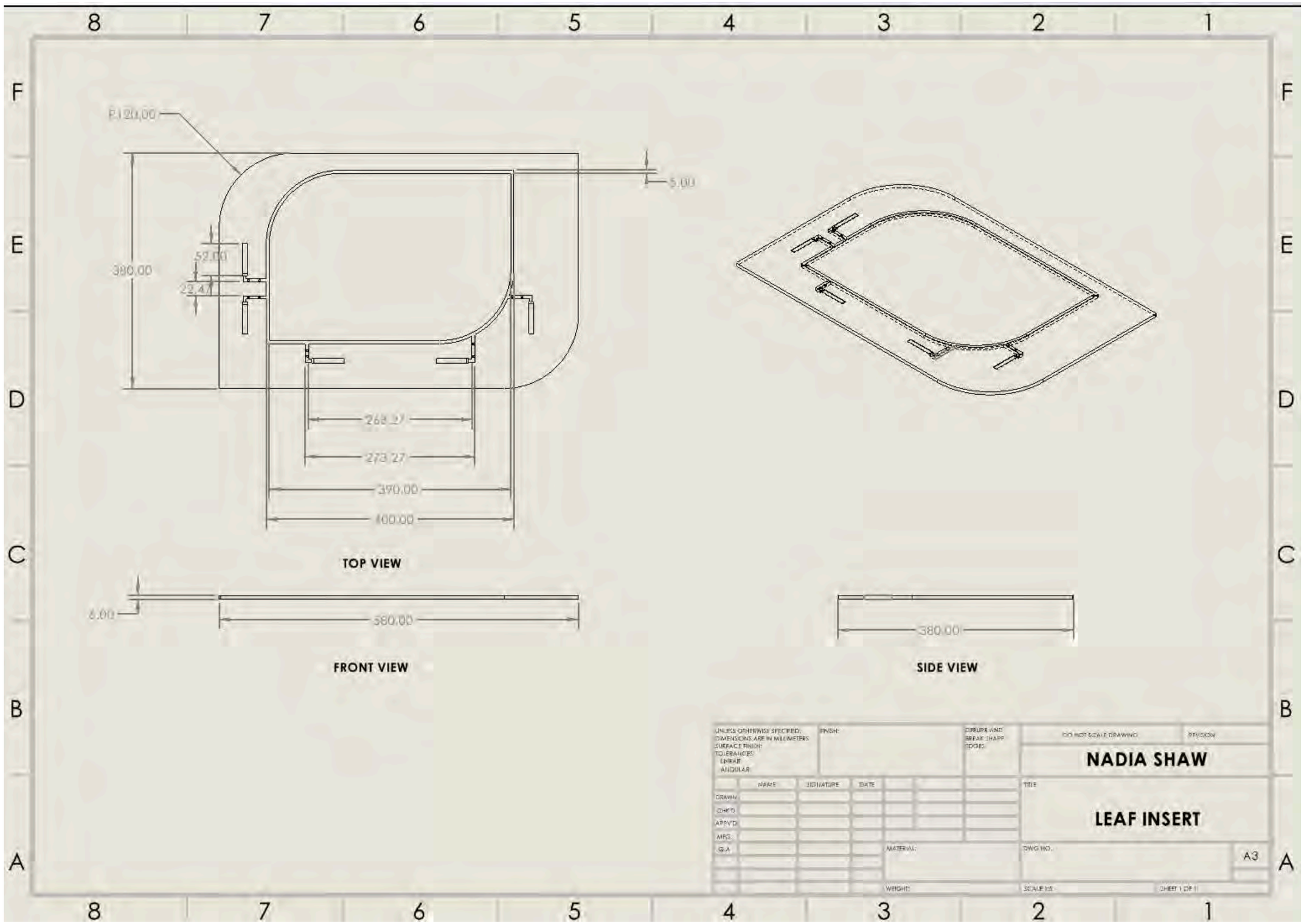
A
31.72
6.00
5.07
TOP VIEW
0.40
88.00
1.00
11.50
1.50
R16.00
R1.00
Ø3.90
3.34
13.31
58.00
5.00
25.89
R1.48
1.18
8.22
R2.00
5.00
57.00
FRONT VIEW
16.34
8.34
R26.00
R6.30
R1.30
67.90
1.40
190°
SIDE VIEW
NADIA SHAW
LCD CLOCK SHELL
A3


TOP VIEW
FRONT VIEW
SIDE VIEW
R10.00
Ø10.48
25.48
55.14
10.48
50.46
6.99
R1.00
55.31
3.07
NADIA SHAW
WHITE CONTROL PANEL
1
A3


8
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R120.00
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380.00
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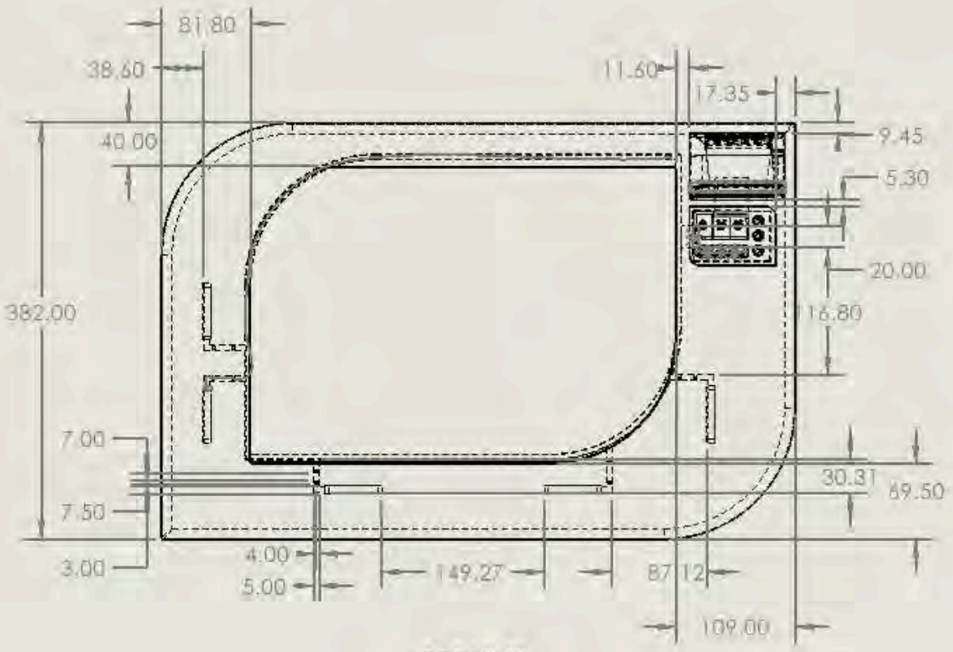
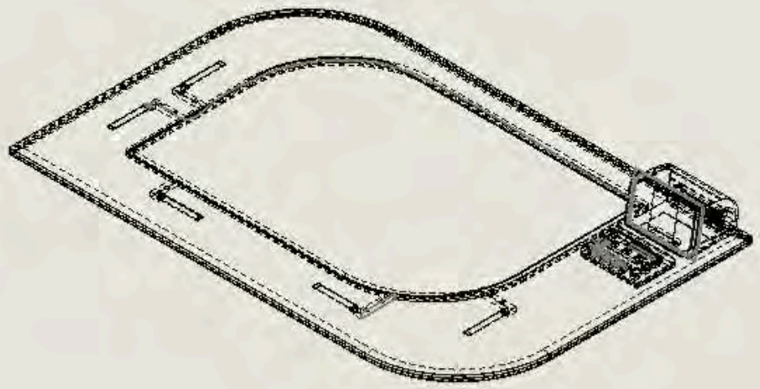
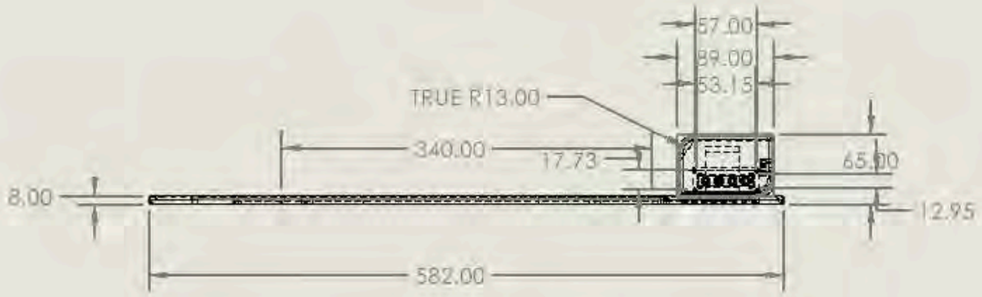
23.47
268.27
273.27
390.00
400.00
TOP VIEW
6.00
380.00
FRONT VIEW
380.00
SIDE VIEW
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR
ANGULAR
FINISH:
DEBURR AND BREAK SHARP EDGES
DO NOT SCALE DRAWING
REVISION
NADIA SHAW
NAME
SIGNATURE
DATE
DRAWN
CHK'D
APPV'D
MFG
Q.A
TITLE
LEAF INSERT
MATERIAL:
DWG NO.
A3
WEIGHT:
SCALE:1/5
SHEET 1 OF 1



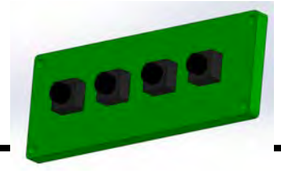
TOP VIEW

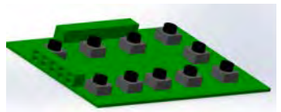




FRONT VIEW

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:			FINISH:			DEBURR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION
							NADIA SHAW	
	NAME	SIGNATURE	DATE				TITLE: STUDYVIBES FULL PRODUCT ASSEMBLY	
DRAWN								
CHK'D								
APPV'D								
MFG								
Q.A				MATERIAL:			DWG NO. 1	A3
				WEIGHT:			SCALE:1:5	SHEET 1 OF 1

Part	**Qty**	**Material**	Reason	Manufacturing process	Price
	1	Silicone	Durable and easy to clean, soft to touch	LSR injection moulding	$1.98/ kg 2.85g Total = 0.005c
	1	Silicone	Durable and easy to clean, soft to touch	LSR injection moulding	6.35g Total = 0.012c
	1	Silicone	Durable and easy to clean, soft to touch	LSR injection moulding	1.58g Total = 0.003c
	1	Polypropylene	Hard, durable material	Injection moulding	$1.38/ kg 6.35g Total = 0.009c
	1	Polypropylene	Robust material for back of LCD clock shell	Injection moulding	1.12g Total = 0.0016c
	1	PCB	Required technology	Custom PCB	~ $5

Part	**Qty**	**Material**	Reason	Manufacturing process	Price
	1	PCB	PCB for control panel	This will be a custom-made PCB	~ $5
	1	Polypropylene	Affordable and sturdy	Injection moulded piece	1103g Total = $1.52
	1.5m	Faux suede	Easy care, inexpensive, available in many colours	Industrial machine stitching	~ $5.10
	1.5m	Vinyl	Cheap and durable, non-slip	Industrial machine stitching	~ $1.15
	5	Piezoelectric biomorph actuator	Required technology	Off-the-shelf component	$19.80
	8	6mm screws	Off-the-shelf component	Off-the-shelf component	$0.12
		1.5mm electrical wire	Off-the-shelf component	Off-the-shelf component	2.4m ~ $0.30

Part	**Qty**	**Material**	Reason	Manufacturing process	Price
	1	LCD screen	Required technology	Custom-made LCD screen	~ $15
	1	Matte polypropylene	Affordable, sturdy	Injection moulded piece	232g Total = $0.32
	1.5m	Matte polypropylene	Affordable, sturdy	Injection moulded piece	5.63g Total = 0.007c
	1	USB-C cable + port	Required technology	Off-the-shelf component	$1.50
				Total raw material cost per unit:	~ $54.85

https://www.alibaba.com/product-detail/White-Waterproof-PP-Board-Hard-PVC_1601576868860.html?spm=a2700.galleryofferlist.normal_offer.d_title.4c0613a0FsdUTh&priceId=9f58a90010844a0ea3c332d9417bf5a8
https://www.alibaba.com/product-detail/100-Polyester-Microfiber-Faux-Suede-Bonded_1601382162661.html?spm=a2700.galleryofferlist.normal_offer.d_image.627313a0FIHOPv&priceId=a9374c43600f4b99ac5551cda176995c

https://www.alibaba.com/product-detail/Superior-LLT-3-Core-1-5mm_1600060994874.html?spm=a2700.galleryofferlist.normal_offer.d_title.dee713a01cJNIc&priceId=6fdf31c7d3bd4b06b176e95120116784

https://www.alibaba.com/trade/search?spm=a2700.galleryofferlist.the-new-header_fy23_pc_search_bar.keydown__Enter&tab=all&SearchText=piezoelectric+biomorph+actuator&has4Tab=true&from=sem

https://www.allpcb.com/blog/pcb-ordering/pcb-cost-per-unit.html
https://www.leadtekdisplay.com/how-much-does-a-custom-lcd-cost-a-1255.html

https://www.alibaba.com/product-detail/High-Quality-USB-Cable-Hot-Sale_60532322668.html?spm=a2700.galleryofferlist.p_offer.d_image.7d4513a0Uoux1E&priceId=e7af213a37ac4cc79f7d2622a78b0adf

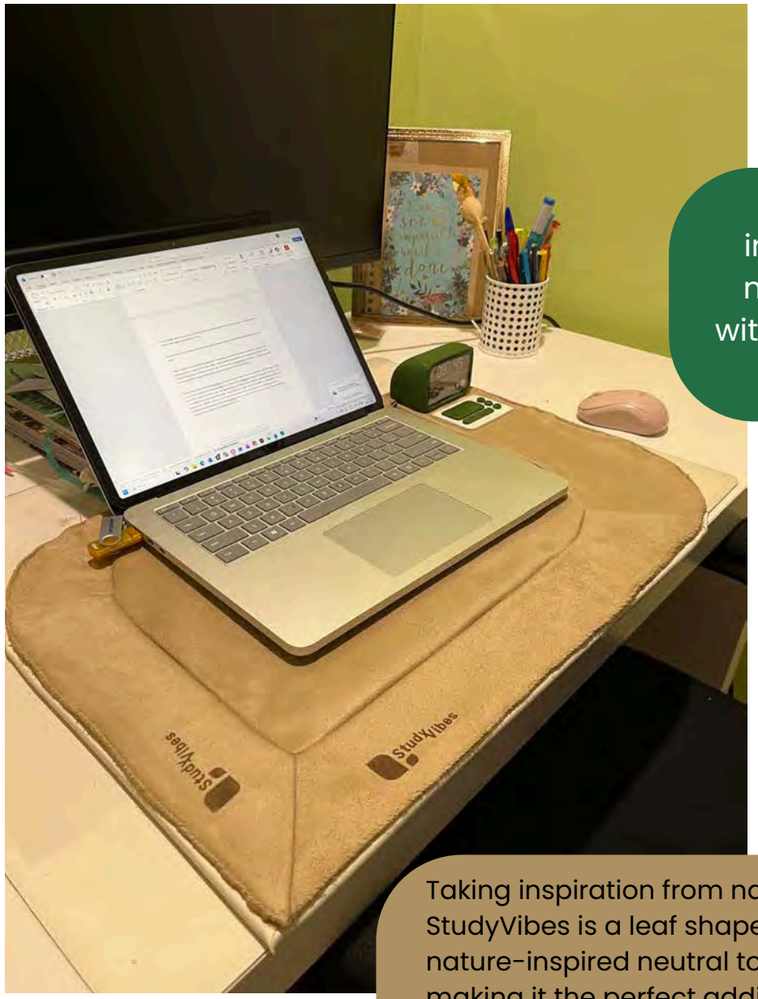
https://www.alibaba.com/product-detail/Wholesale-Silicone-Powder-Injection-molded-Raw_1601518524101.html?spm=a2700.7724857.0.0.7239219cPQNfu7

https://www.alibaba.com/product-detail/Wholesale-Silicone-Powder-Injection-molded-Raw_1601518524101.html?spm=a2700.7724857.0.0.7239219cPQNfu7

This costing is only for raw materials, and does not account for tooling.

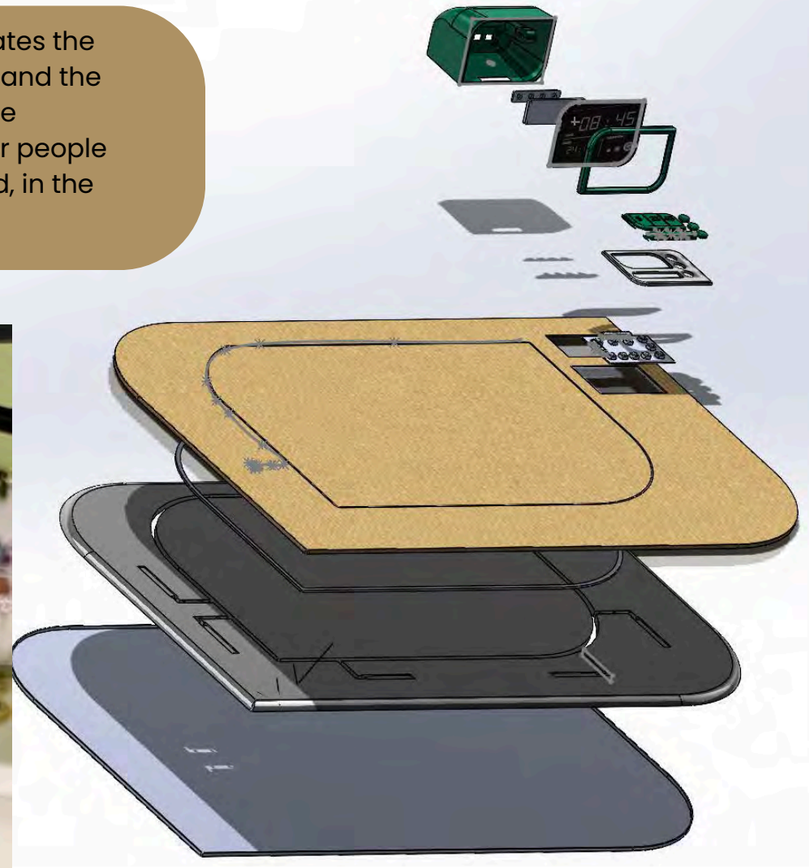
As injection moulding is the main form of manufacturing, significant quantities of the product would need to be manufactured and sold in order for it to be feasible.

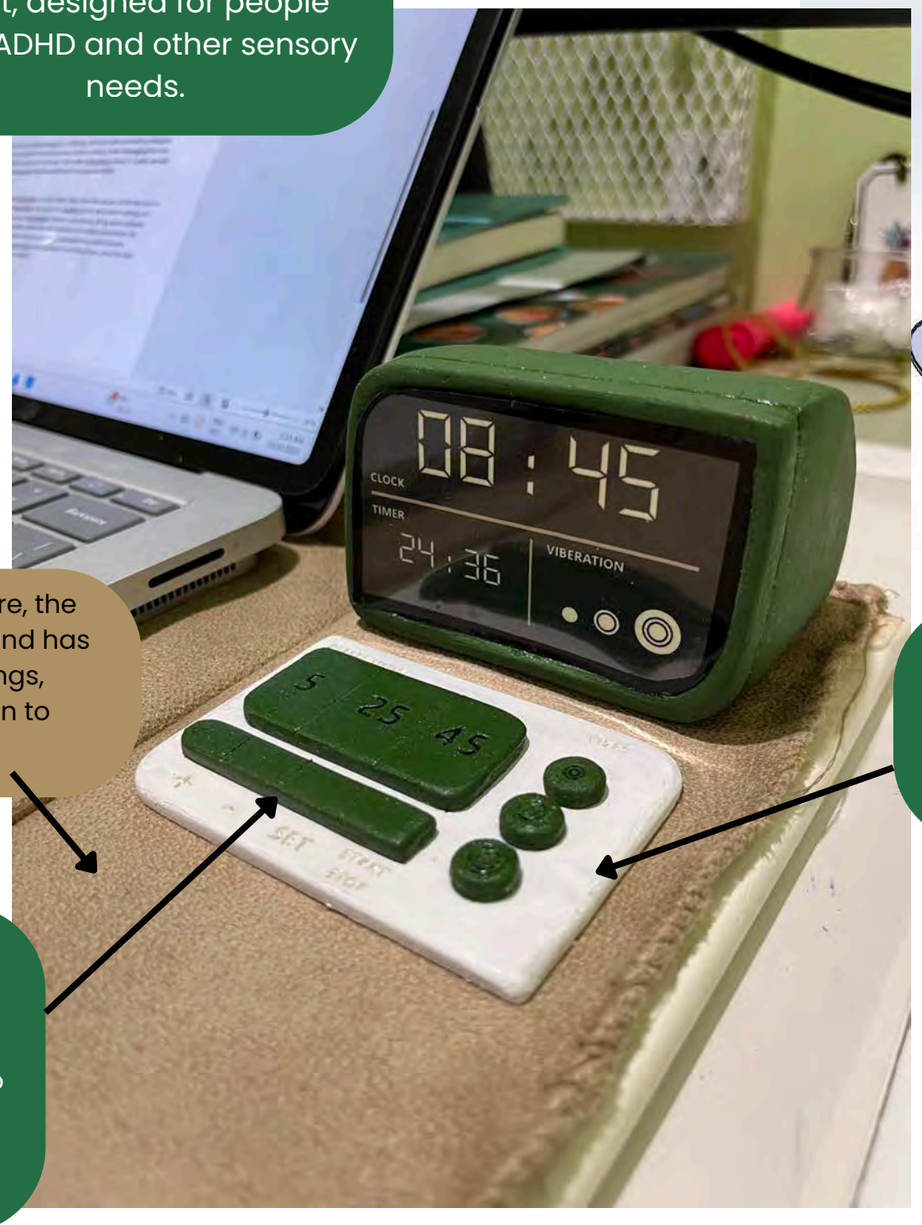
Week 14 | StudyVibes summary



The StudyVibes is an innovative vibrating desk mat, designed for people with ADHD and other sensory needs.

The innovative vibration timer eliminates the need for users to use a phone alarm, and the physical, novel nature of this make the StudyVIbes the ideal timer product for people with ADHD, helping them stay focused, in the moment, and eliminate distractions.





Taking inspiration from nature, the StudyVibes is a leaf shape, and has nature-inspired neutral tonings, making it the perfect addition to any study space.

The device features three vibration settings, so that the user can make StudyVibes vibe right for them. it also shows a clock on the interface.

The desk mat offers users a clean space to study, with a built-in vibrating timer. The StudyVibes has three preset timers, allowing the user to practice the Pomodoro technique, as well as a custom timer setting.

StudyVibes