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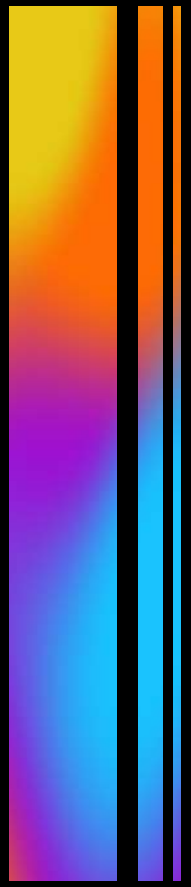


InPulse (Live)

Adaptive Music Production Device

Brief

Design a hardware system for live electronic music production and performance, integrating sequencing, mixing, and effects controls.

Overview

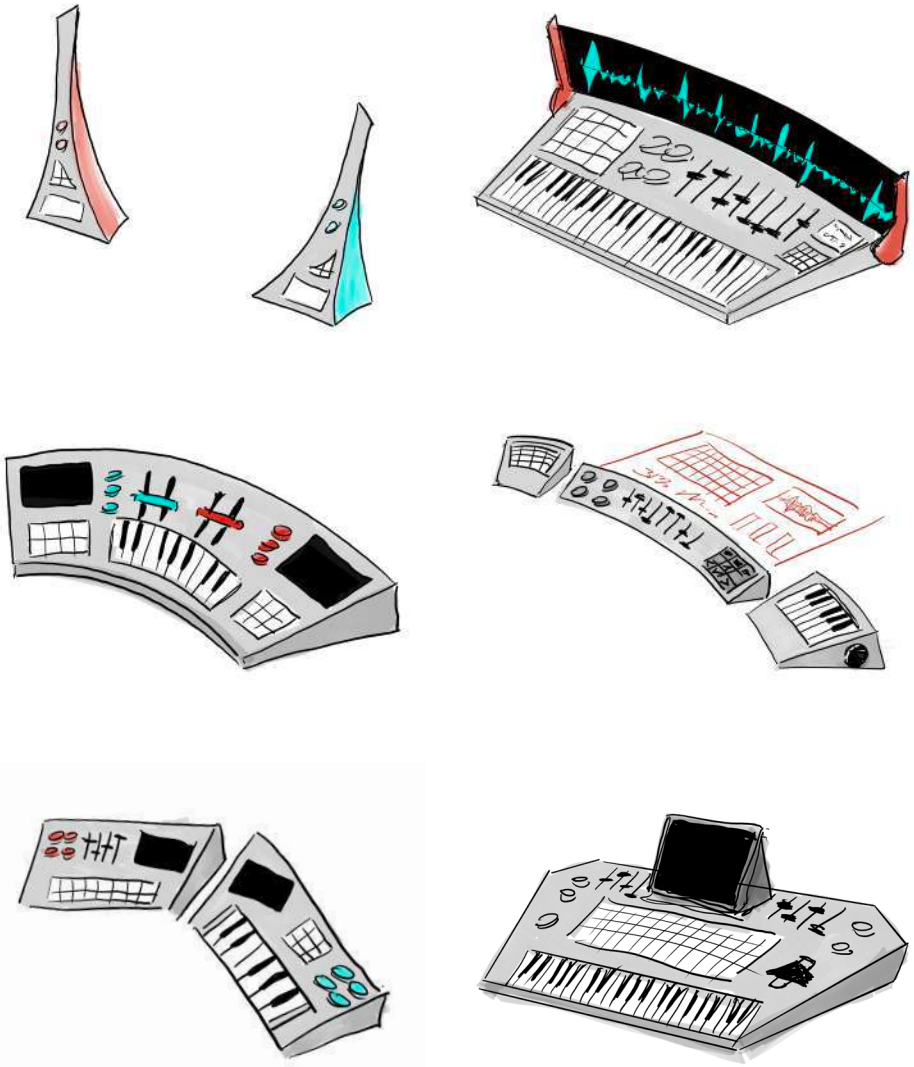
Currently users must master a variety of devices to make music live.



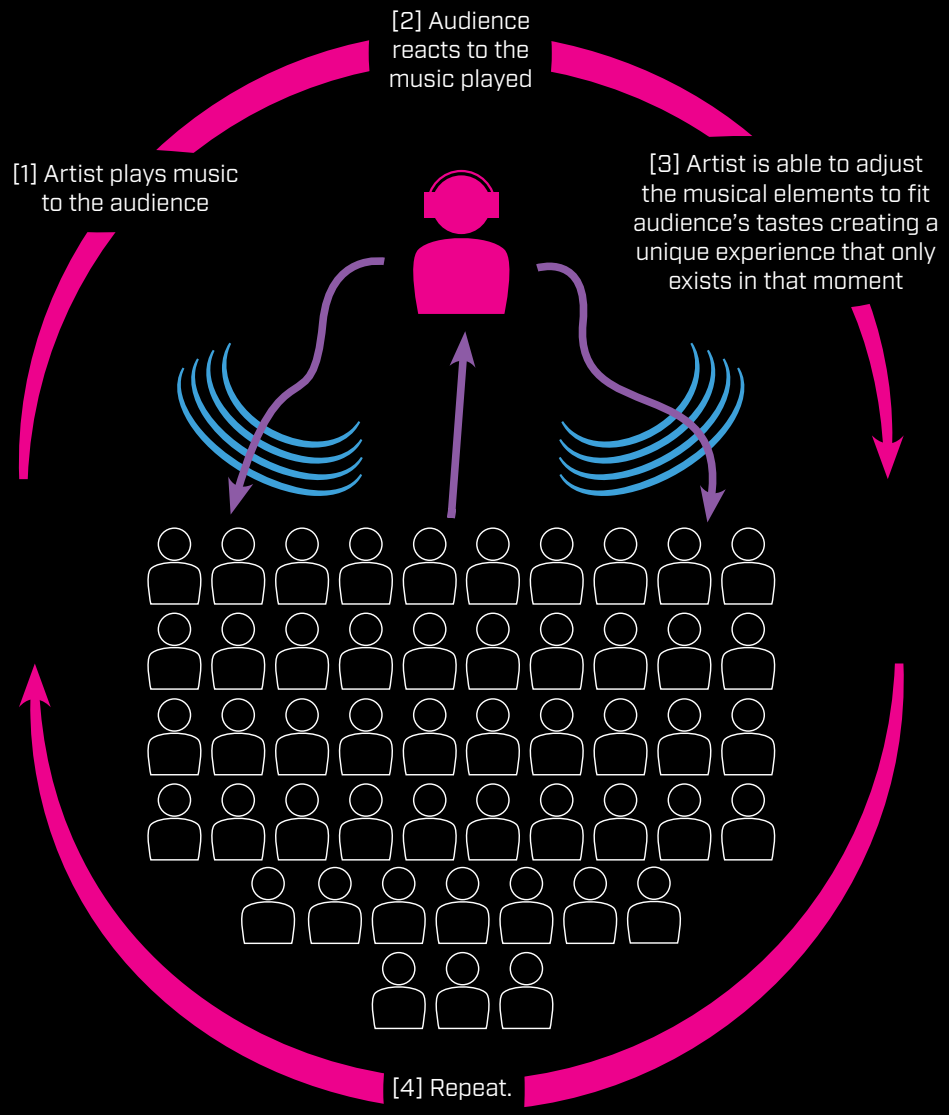

Issues to Address

- Redundant control features
- High monetary and time cost
- Portability for live performances
- Complex cable management

Initial Ideas



Concept Visualisation



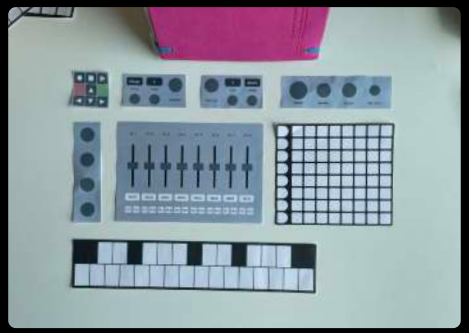
Function Table

Expert users were consulted to create a list of necessary functions. These were then translated into interface components and ranked by priority to inform which would be primary and which secondary.

Feature/Function	Interface Components	Priority
Playback (Record/Stop/Play/Pause)	Illuminated transport control buttons	High
Tempo/BPM Adjustment	Dedicated rotary encoder knob, main display	High
Volume Mixing (individual track levels)	Linear faders, illuminated solo and cue buttons	High
Loop Selection & Cueing	Illuminated button grid, main display	High
Grid Mode Control Buttons	Dedicated grid mode buttons, main display	High
Real-Time Sampling & Loop Recording	Dedicated sampling buttons, grid pads, rotary encoders (length, start/stop points, EQ)	High
Effect Activation (Reverb, Delay, etc.)	Illuminated FX buttons, rotary encoders, mini auxiliary OLED screens (FX status)	High
Parameter Adjustment for Effects	Rotary encoders, potentiometers, main display	High
Sequencing & Step Sequencer Control	Button grid (pads), illuminated step indicators	High
Octave Shift (Keyboard Mode)	Dedicated octave shift buttons (illuminated)	Medium
Pitch Adjustment (Fine/Coarse)	Rotary encoders, main display	Medium
Track Browsing & Loading	Rotary encoders, main display, nav. buttons	Medium
MIDI Input & Output Routing Control	Main display, rotary encoders, nav. buttons	Medium
Recording Sessions to Storage	Shift nav. button function, screen indication	Medium
Visual Feedback for Status Indicators	RGB LED indicators (integrated into buttons)	Medium
Microphone/Instrument Input Gain	Rotary knobs, main display (level indicators)	Medium
Headphone Monitoring Control	On-screen UI function, main display	Low (Shift/UI)
Master Volume Adjustment	On-screen UI function, rotary encoders	Low (Shift/UI)
Metronome & Click Track Functionality	Rotary encoder press, tempo knob	Low (Shift/UI)
Firmware & Software Updates (via USB)	USB-C port, main display (update progress)	Low (Shift/UI)
System Settings (brightness, contrast, etc.)	Rotary encoders, main display, nav. buttons	Low (Shift/UI)
Backup/Restore System Settings	MicroSD card slot, main display	Low (Shift/UI)
Button Configuration & Mapping	Main display, nav. buttons, rotary encoders	Low (Shift/UI)
Power On/Off	Dedicated physical power switch	Low (Shift/UI)

Co-Design

User testing informed the control layout design. Six experts with a variety of experience each created a layout they found to be ideal.

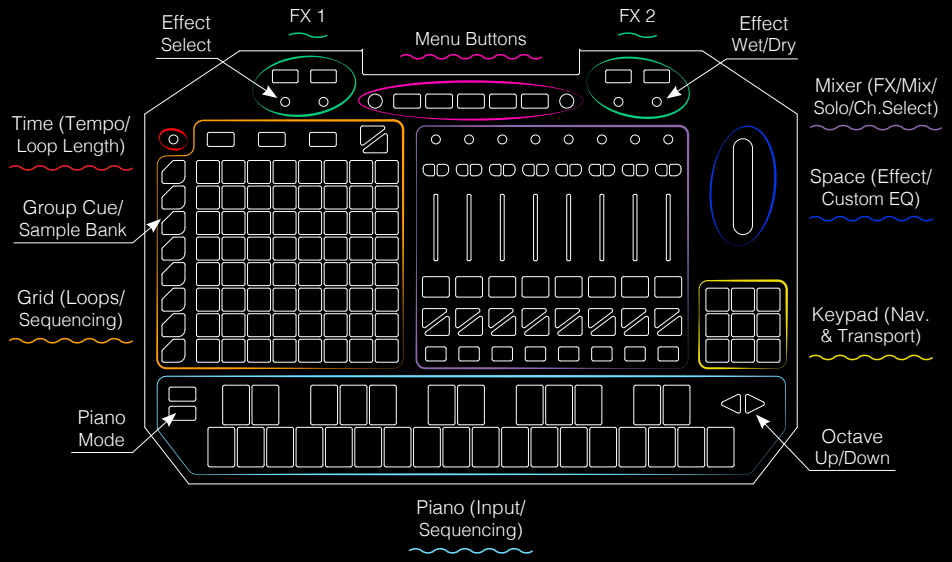





These were then ‘averaged’ and a set of human factors principles were applied to make the layout more intuitive for non-expert users.

Layout & Labelling

Below is a control diagram, with the labels and graphical decals.



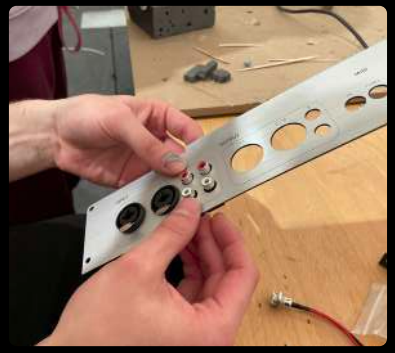
Design for Disassembly

The device can be disassembled with 6 screws, without lifting the base.

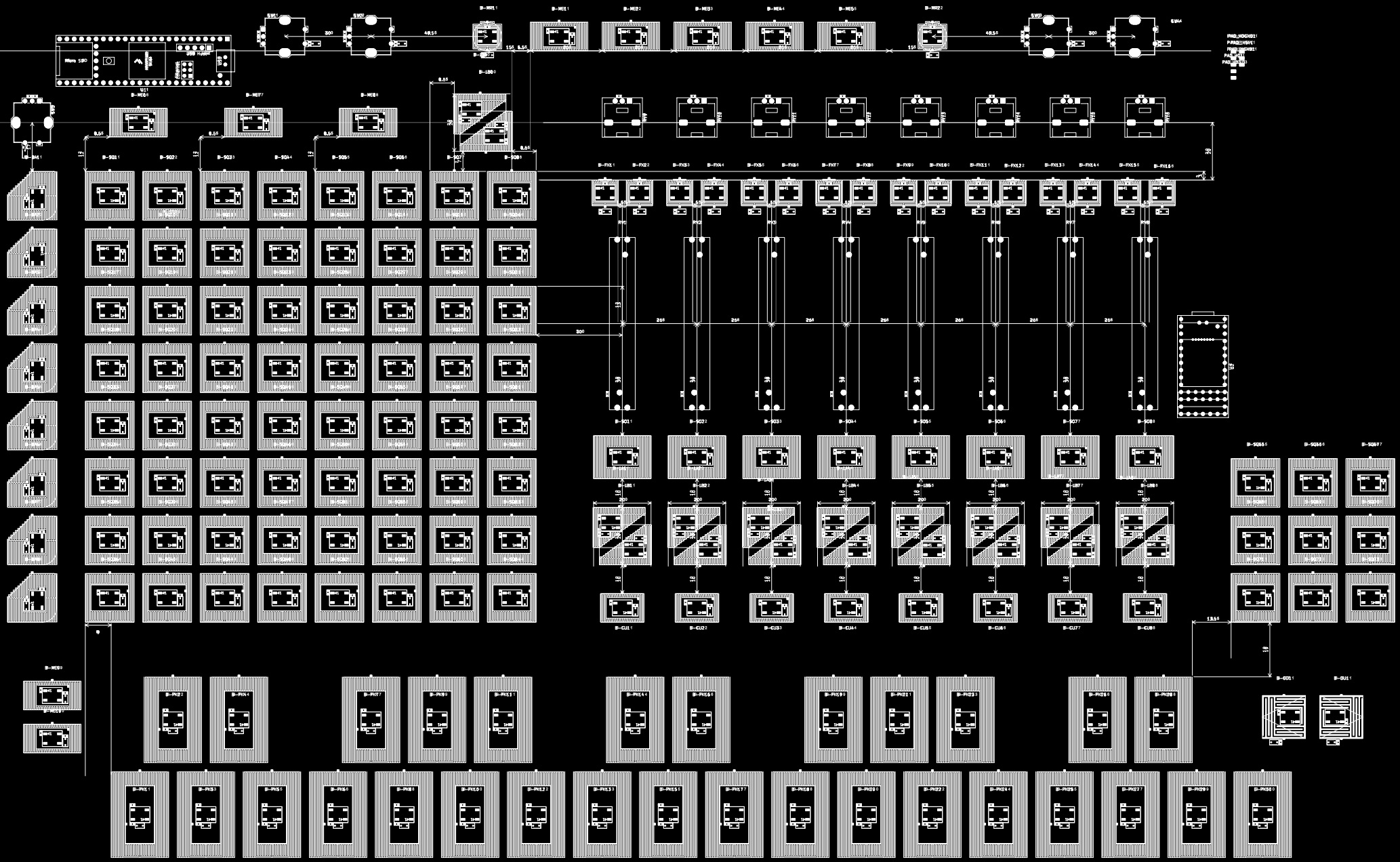
Modelmaking



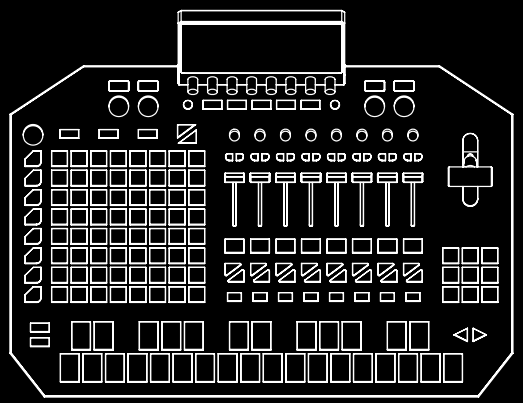


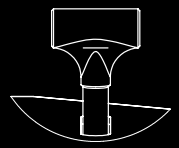




PCB Design



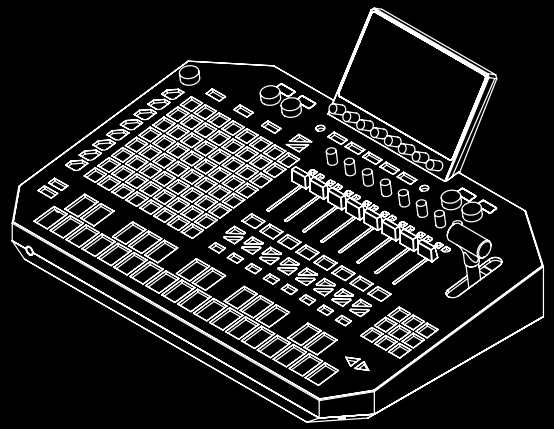
PCB design created using KiCad.

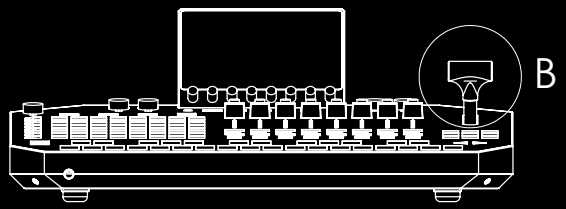


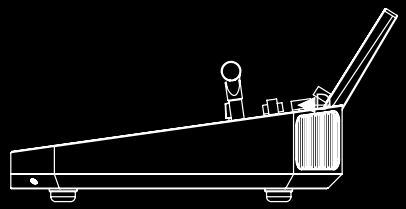


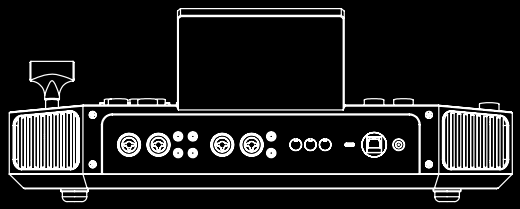
DETAIL B

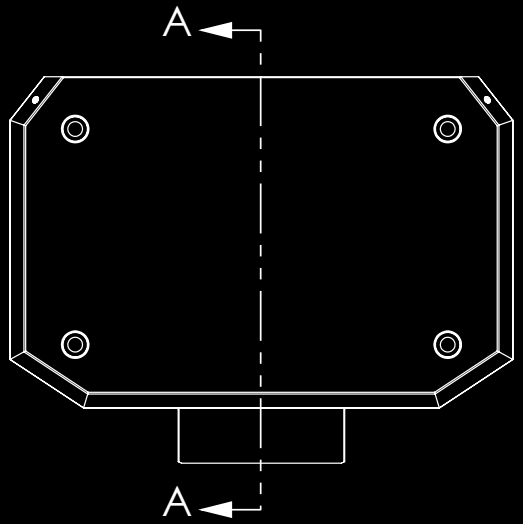
SCALE 2 : 5

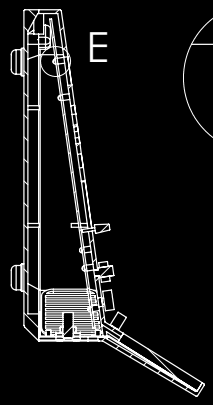


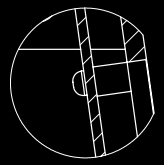












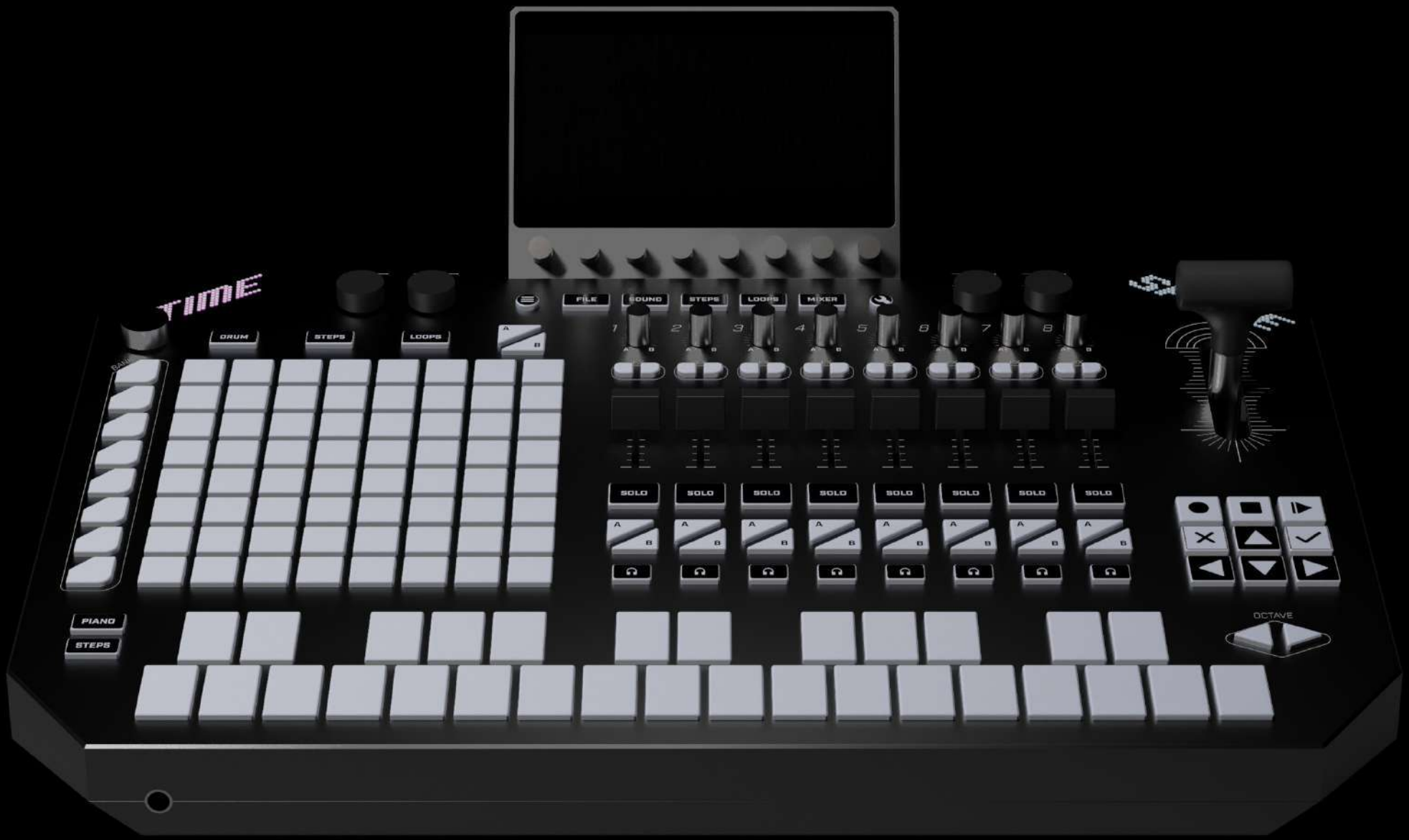
DETAIL E

SCALE 1 : 1

SECTION A-A

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

Final Design



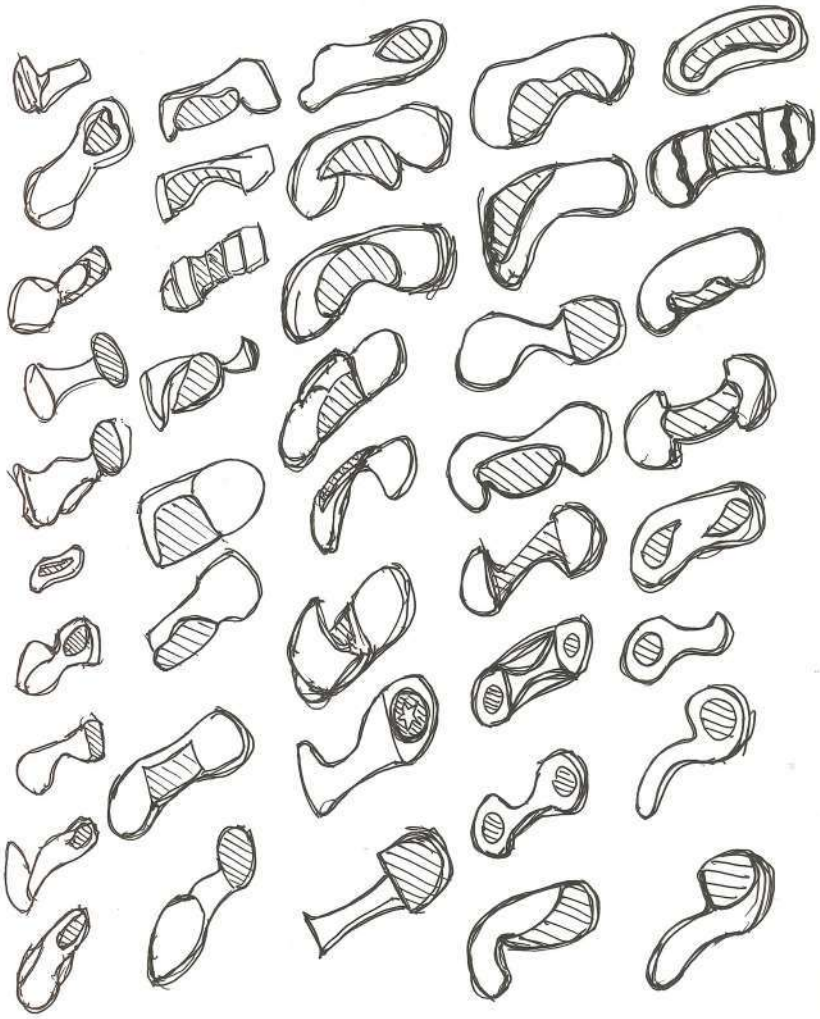
Trax

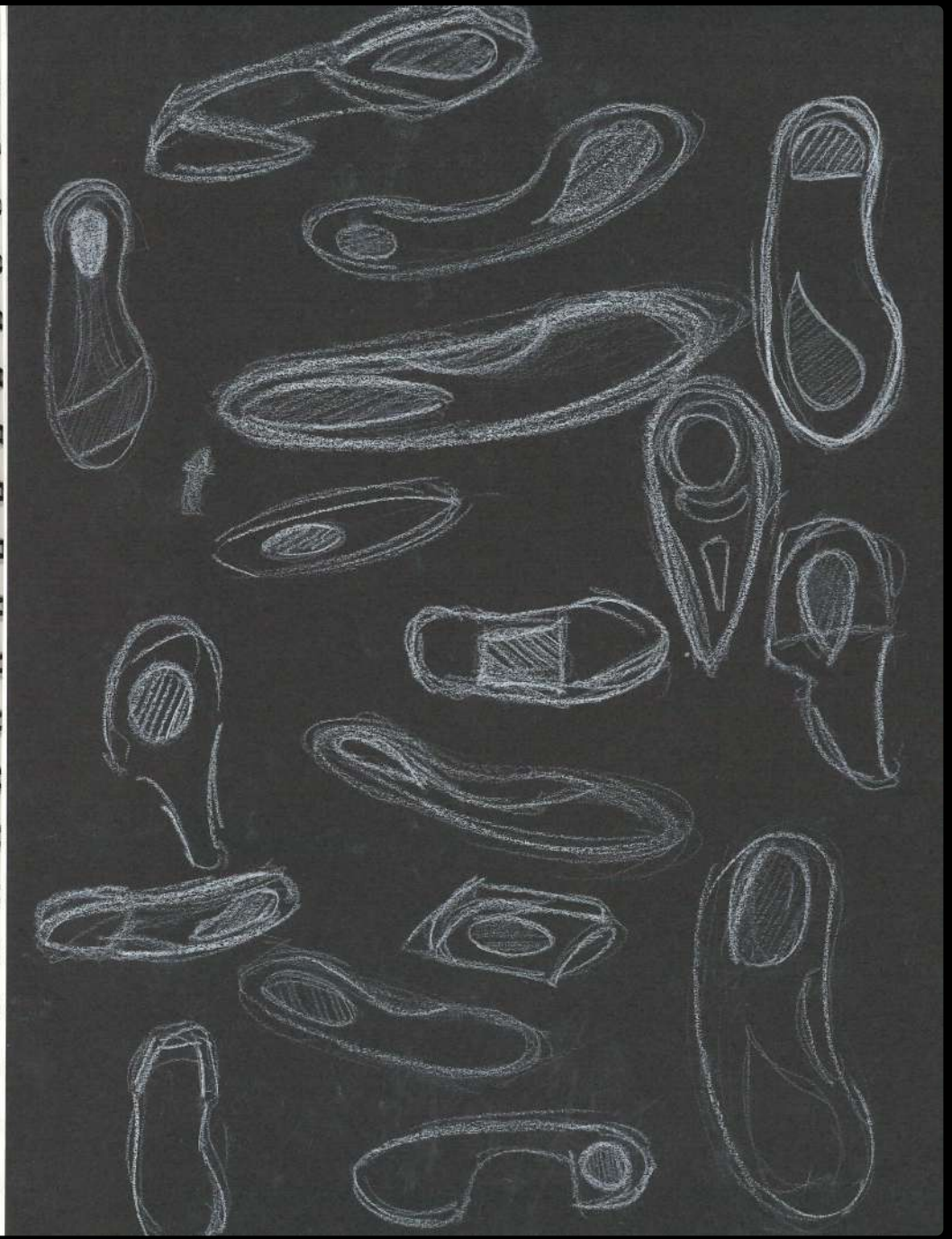
Discreet & Non-Invasive Glucose Monitor

Ideation

Sketching.

Initial form ideation was considered (below) and developed over a series of sketches, which can be flipped through on the opposite page.





Sketch Modelling

Cardboard ideation models.

Foam-board ideation models.

Carved foam ideation models.

Foam models.

Foam + 3D printed (with magnets)

Model used for testing.

Final Design

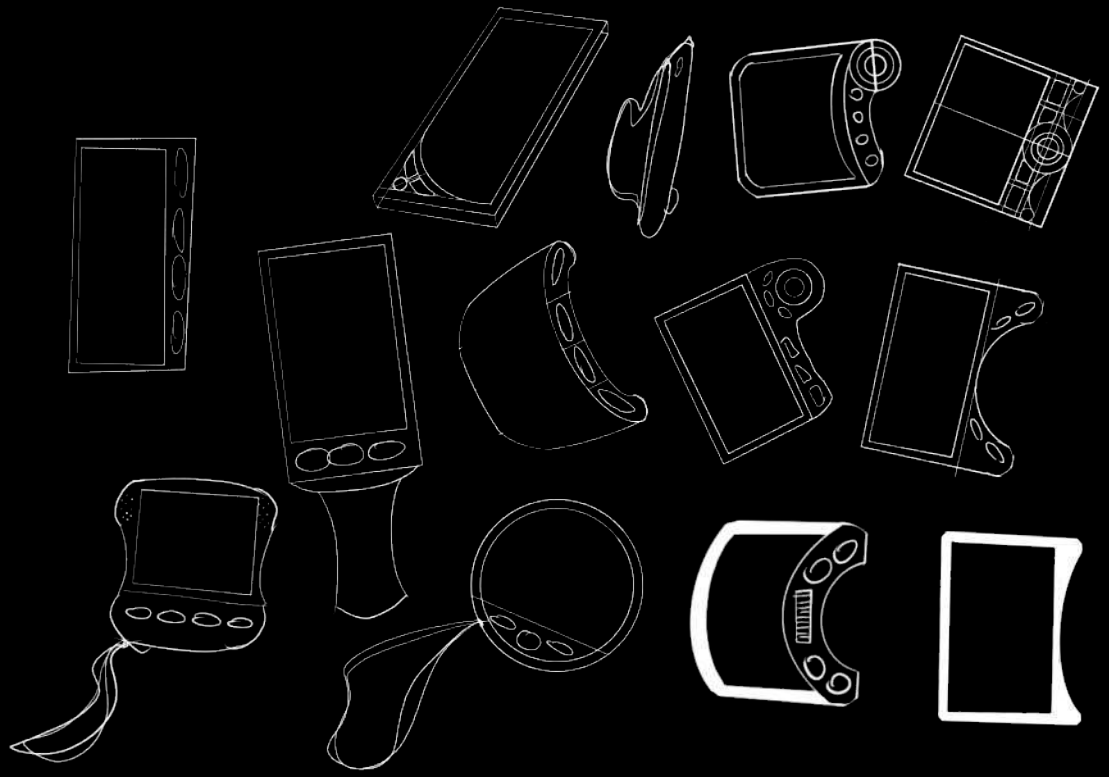
Ripple

PDA for Retail Management

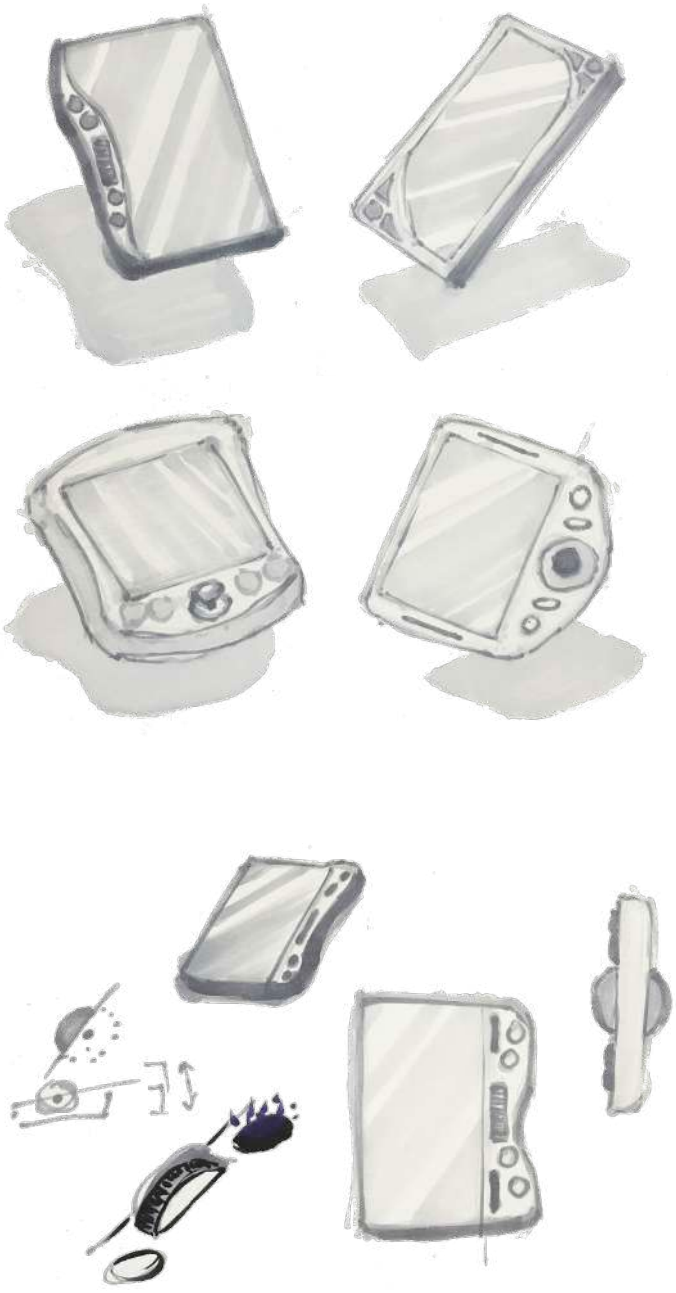
Brief

This project involved redesigning a handheld PDA (personoal digital assistant) to better support retail employees and managers in daily store operations. Focusing on core functions like inventory management, pricing, customer assistance, and task coordination, the new PDA design emphasizes one-handed usability, intuitive navigation, and ergonomic efficiency. Grounded in human factors principles, the solution streamlines workflows and reduces physical and cognitive strain in fast-paced and modern retail environments.

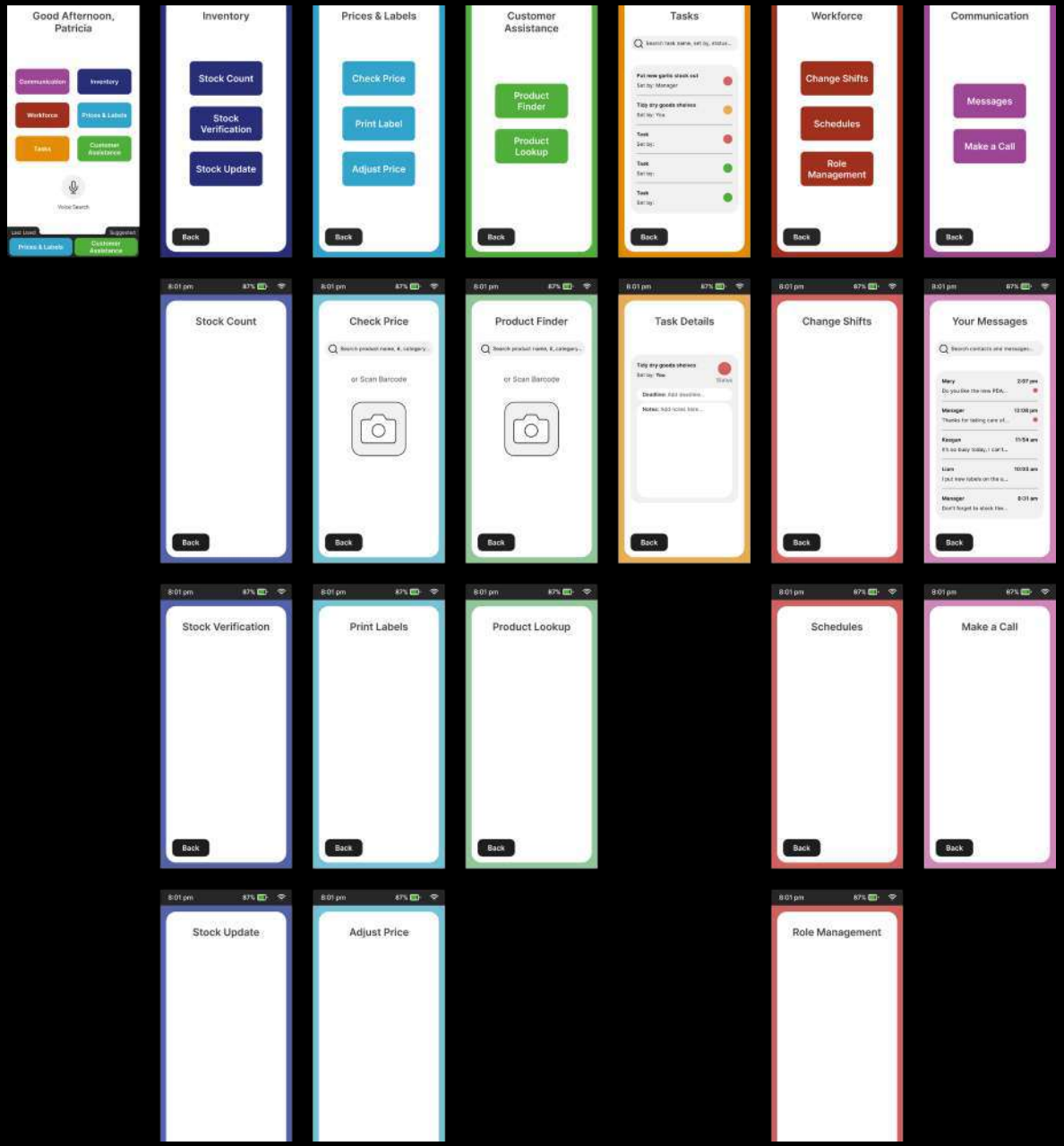
Ideation Sketching



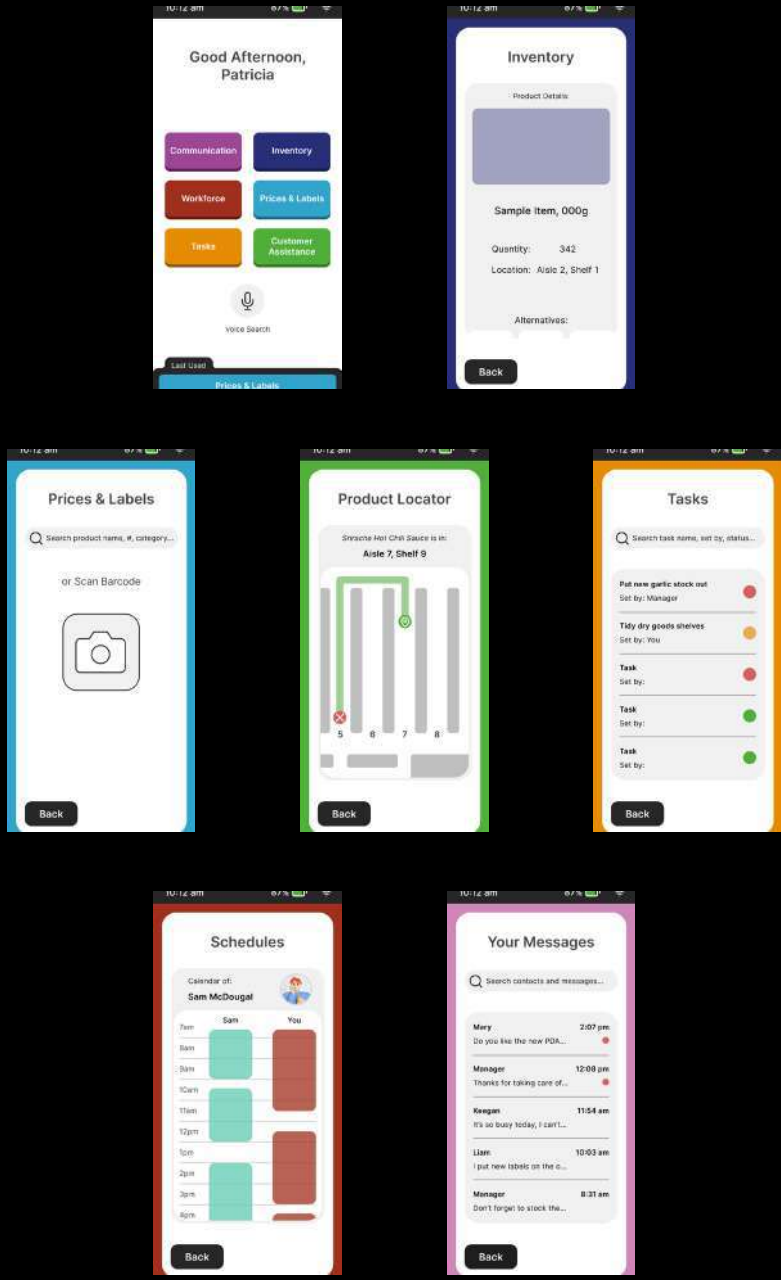
Sketch Development



Functional UI Prototype



Final Wireframes



Final Design