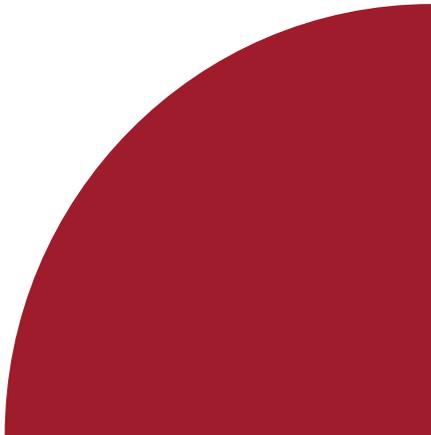




LANDLINE COMMUNICATION DEVICE

AUDIENCE AND CONTEXT NOV 2014



Mona Sharma

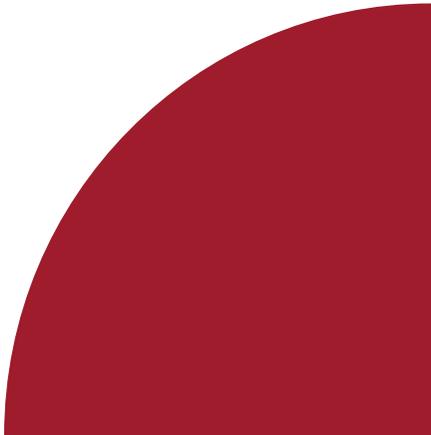
Sheffield Hallam University

October 2014

CONTENTS

Marketing Report	5
Design Brief	7
The Greenwoods	8
Wendy Greenwood	9
Wendy's Current Products	10-11
Wendy's Aspirations	12-13
Target Market	14-17
Technology & the Over 55's	18
UK Telecoms Sales and Statistics	19-20
Existing Products	21-22
Summary	24
Bibliography	25-26

Project Log	29
Recap	31
Design brief	31
Wendy in a nutshell	32
Research summary/initial design specification	33
Existing communication device	34-35
The cordless telephone	36-37
Which type of plastic?	38
Proposed features	39
Exploring contrast	40-41
Phase one	43
sewing machine	43
sewing box	44
Phase two	46
studio day	46
the outcome	47
Phase three	48
form & texture	48
paper folding	49
Phase four	52
gemstones	42
final idea	53
Prototyping	54
Colours	55
Display	56
Keypad	57
The finer details	58
font	58
icons & colours	59
The plug	60
Final design	62-63
Using the phone	64
'Find my phone' feature	65
Manufacturing	66-67



LANDLINE COMMUNICATION DEVICE

Marketing Report

DESIGN BRIEF

To design a new **landline communication product** that can be installed and used in a domestic living space. It must use known technology and is to be manufactured by a partner company in China.

What defines a *landline communication product*?

A device that allows communication between two or more people to converse via audio, video or text, when they are not near enough to talk face-to-face. The information is converted and transmitted over a cable (landline) and reproduced to the user(s) at the other end.

THE GREENWOODS



58,
quantity
surveyor,
full time.
Earns
approx.
£70,000 p/a



26,
office job,
full time.
Looking to
move out



21,
studies
abroad



17,
college
student



55,
local
haberdashery
shop assistant,
part time.
Earns approx.
£10,000 p/a

WENDY GREENWOOD

Wendy is a quirky, practical and organised woman. She feeds her passion in craft by working at her local haberdashery store and regularly designing and making furnishings and decorations for her 4-bedroom detached home in the town of Belper, Derbyshire.

Her other interests include gardening, baking and reading. She also regularly holds book club meetings at her house, allowing her to socialise and exchange thoughts about her favourite books.

Though her husband earns plenty, she is “moneywise” but will not compromise on her social appearance. E.g. shopping at Tesco using Waitrose bags for life, or making her own set of cushion covers inspired by the new range at John Lewis - an opportunity to add a fun, feminine, personal touch to her quiet home.



WENDY'S CURRENT PRODUCTS

(Clockwise from top left)

A selection of books - Wendy is an avid reader, always on the lookout for something different, whether it is the design of the cover or the storyline itself.

•
Amazon Kindle - a birthday present that she takes to work. She loves the lightweight, portable and inconspicuous design. She even personalises it by making her own covers to protect it.

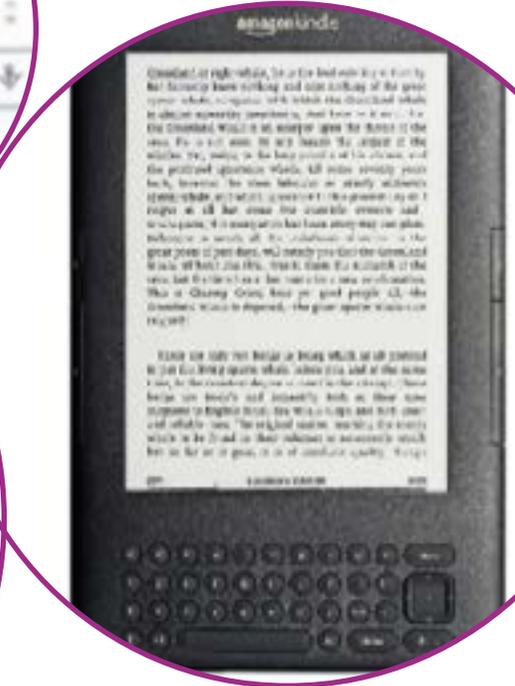
•
A standard non-branded corded silver telephone from Tesco - chosen by her husband, who thought it would match the TV. The TV has been replaced twice since and is now black.

•
Cath Kidston mugs - some of Wendy's few prized possessions that she uses only for visitors. The colourful floral patterns are what attract her to them - they remind her of the patterned textiles she works with often.

•
A selection of rolls of yarn and knitting needles in her favourite department store - John Lewis. She'll try to find similar materials in her own workplace to save money, by using her discount.

•
Kenwood Patissier food mixer - another prized possession given to her as a gift. It's high gloss red, all metal body gives Wendy a feeling of authority and power when she uses it in front of friends.

•
Singer 15-91 sewing machine - this infamous brand of sewing machine is Wendy's biggest pride. It's strong cast iron body decorated with gold ornate patterns gives her a sense of expertise and knowledge whenever she uses it.



WENDY'S ASPIRATIONS

Wendy's aspirations - to have a fully equipped craft studio, high quality kitchen items and more top-of-the range chinaware to impress



• *Key factors Wendy looks for in a product:*

TARGET MARKET - *Comfortably-off families, in modern housing*

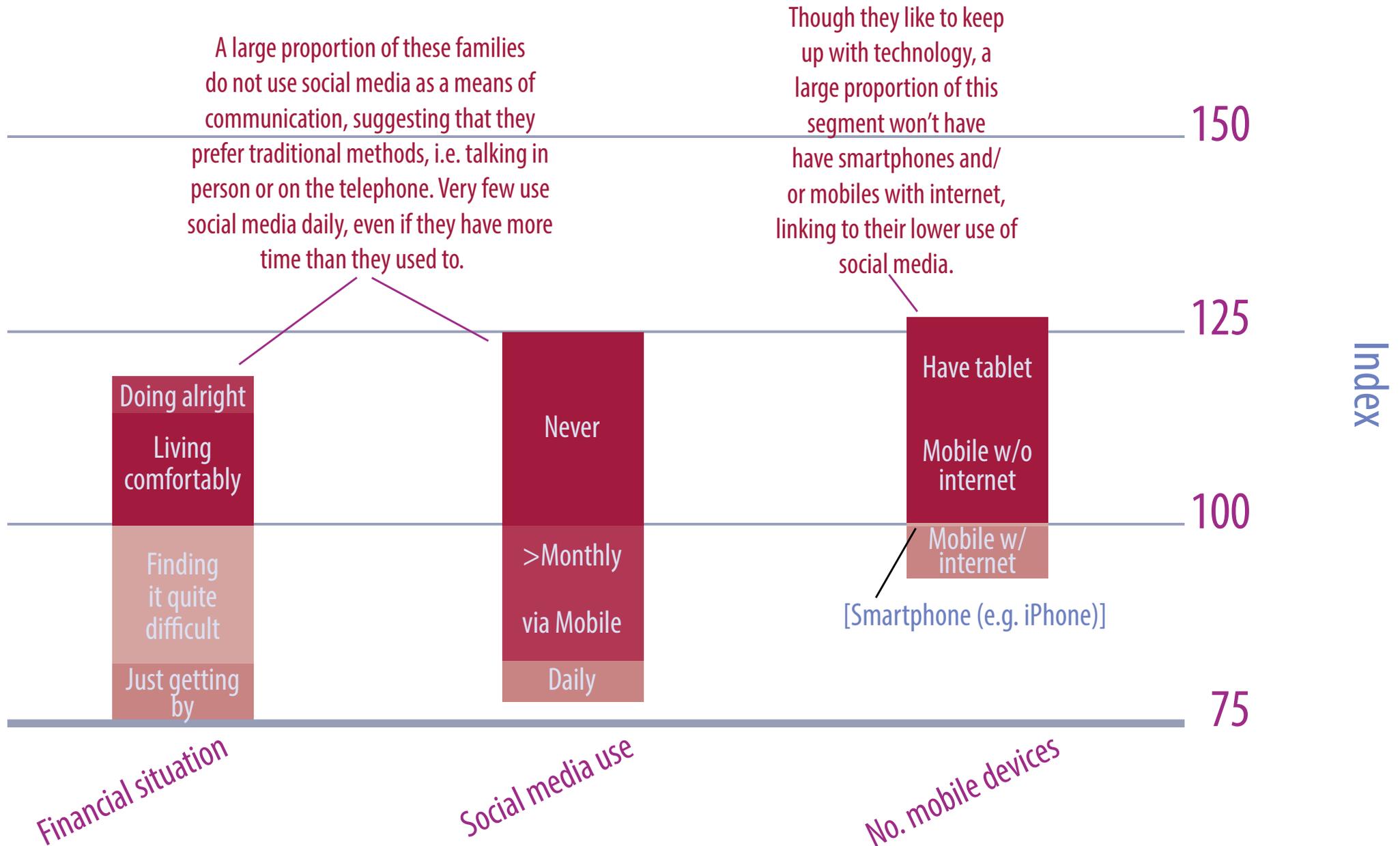
On average, there are more older residents (50-74) than younger ones (25-34).

Therefore format and design of the device should be mature and straightforward to use, making it appropriate for a greater percentile of the market segment. It could also have elements taken from design classics in the past, which could make it more user friendly.

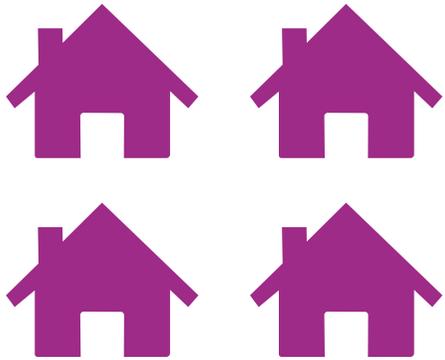
The majority of this market segment earn more than the national average. They may also spend less on food and bills as their children may have moved out, giving them more spending money. This could make them more willing to spend more on a product and treat it as an investment, as they still like to put their money into savings accounts etc. too.



THE STATISTICS



TARGET MARKET- *Comfortably-off families, in modern housing*



They tend to live in detached or semi-detached four-bedroom houses, in towns and/or suburbs.



Typical jobs range widely from skilled manual workers to professionals, showing that this segment typically has a busy lifestyle trying to fit leisure around their job.



Their household income is a little above the national median, perhaps twice the median (median = approx £30,000); this allows them spend a little more freely.



Their social networking usage is below average., suggesting people of this user group prefer more traditional methods of communication, i.e. talking face to face or via telephone.



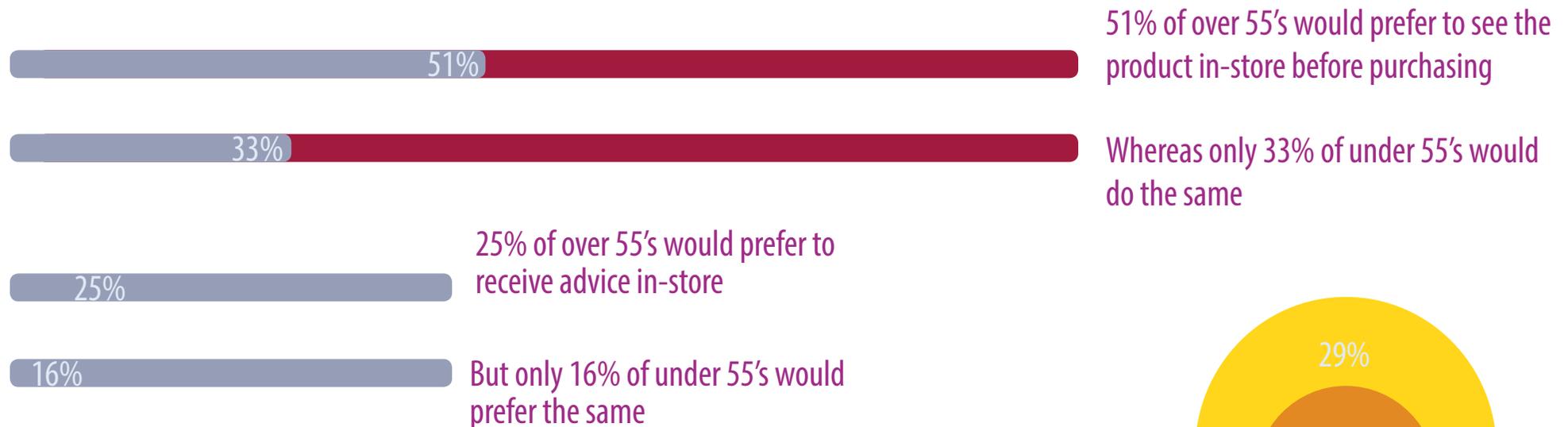
They are typically older and have an average of two children. Some are empty nesters.



Typical interests include golf, gardening and travel. They try to spend more of their money on experiences and leisurely activities, than just shopping alone.

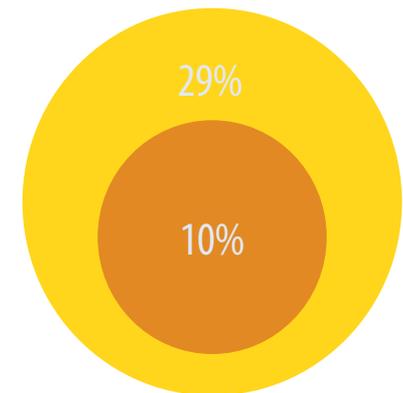
TECHNOLOGY & OVER 55's

It appears that the older the user, and/or the older they become, the more they prefer 'easy to use' products, which they have seen in-store and asked for advice on before purchasing:



Following this, it would be wise to say that based on the market segment, the device should be advertised and sold in-store instead of online, though there is nothing wrong with making it available for sale both ways.

It should be straightforward to use, but not intrusive to older users.



29% of over 55's are influenced most by ease of use when purchasing an item, compared to a mere 10% of under 55's.

UK TELECOMS SALES AND STATISTICS



Number of residential fixed landlines in the UK (millions).

NOTE - although this may suggest an increase in telephones sales, it is not. The increase is due to more homeowners requiring a landline for internet access.



24.8 billion minutes of calls were made in Q1 of 2013, as opposed to 21.9 billion minutes in Q1 of 2014. This 11.8% decrease could be due to the increase in popularity of mobile phones.

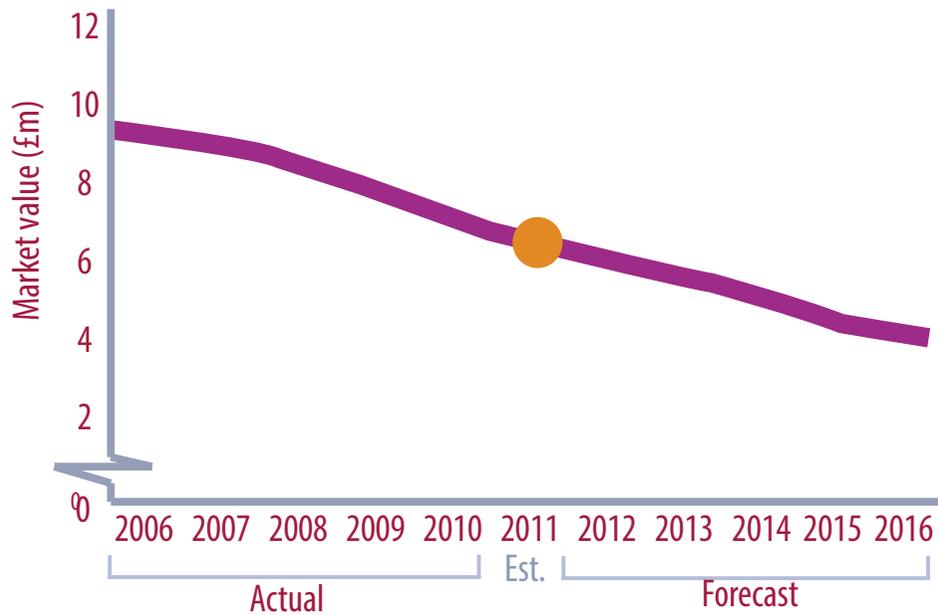


No. of fixed telephone lines in use decreased from 34.2 million in 2008 to 33.4 million in 2013.

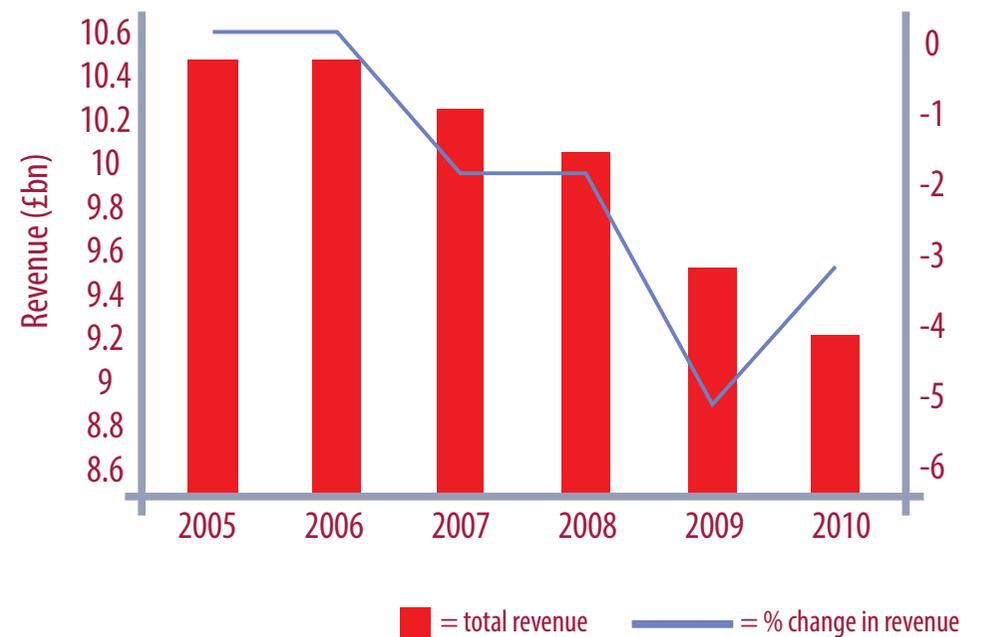
Simultaneously, the proportion of adults living in a mobile-only home increased by 1% from 15% (Q1 2013) to 16% (Q1 2014)

UK TELECOMS SALES AND STATISTICS - *cont.*

1. 2011 FIXED LINE TELECOMS MARKET FORECAST, 2006-16

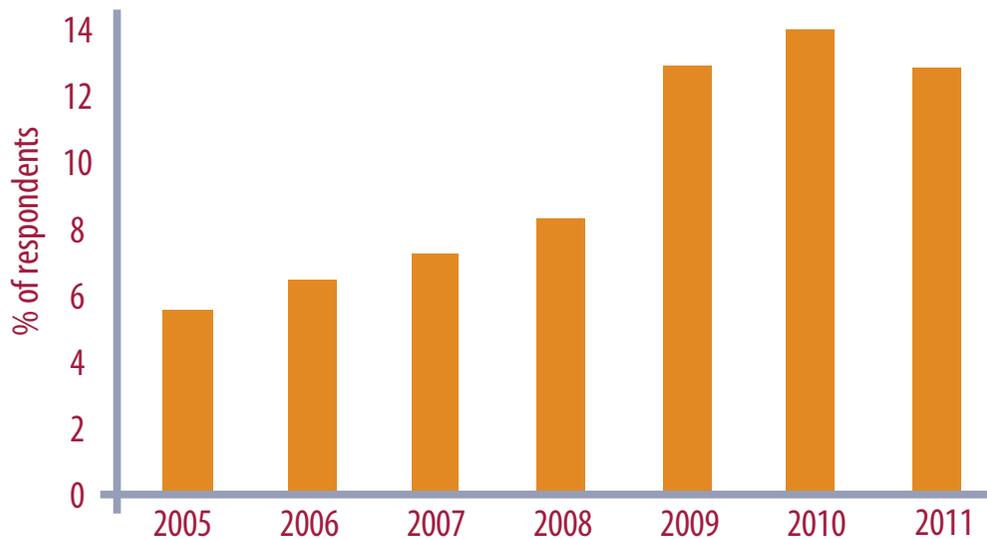


2. TOTAL FIXED LINE REVENUE AND ANNUAL % CHANGE, 2005-10



As shown in graph 1, the value of fixed lines has been decreasing steadily and has been forecasted that the value will continue to go down steadily at this rate. Graph 2 supports the decline in graph 1; the total revenue of fixed lines appears to be decreasing steadily with a change of -2% on average.

3. MOBILE-ONLY HOUSEHOLDS, 2005-11



Graph 3 shows the steady increase of mobile-only homes - a strong factor for the decrease in fixed line revenues.

ATTITUDES TOWARDS FIXED LINE TELEPHONY, DECEMBER 2011*

58%

"Landlines have a better quality connection than mobile phones"

57%

"I would use my landline more if it was cheaper to call mobile numbers on it"

46%

"I mostly use my landline to call premium rate/international numbers that are too expensive to call from my mobile"

32%

"I have a landline mostly as a backup in case my mobile fails or can't be reached"

Although fixed line telecoms may be going downhill, there are still strong reasons as to why the market hasn't collapsed quicker. Fixed lines offer better quality calls and are generally cheaper, giving reason to continue designing landline devices.

*Based on 1,801 internet users aged 18+, who own a FLT.

EXISTING PRODUCTS



1. This basic white corded phone is great for users with a low budget or those who need a temporary replacement phone, due to its simple casing and it having fewer features.

2. This BT cordless phone focusses more on features than design, making it more practical. It has an answering machine, a handsfree facility, nuisance call blocking, volume control, and more. Many of these features are made possible, thanks to the small digital display.

3. The neo-retro Swiss styling is the key selling point for this cordless phone by Swissvoice, compensating for the lack of built-in phone features. The digital display is hidden away under the not-so-ergonomic handpiece.

4. This Panasonic cordless phone comes with all of the features mentioned above, plus several more such as conference calling. The charger dock has buttons at the front instead of to one side (see no. 3), making it more accessible to users of either hand. It has a greater weight and more durable casing, increasing the quality and therefore price.

5. The touch screen feature has made its way into this Panasonic phone, making it great for consumers who prefer the smartphone user interface, or those who are style conscious. The glossy metal casing and rounded edges are what further increase the price of this phone.

Cost

Material

Corded

Texture

Features

Personality

Cordless

Colour

Durability

Style

SUMMARY

Following this research, it can be said that the device *should*:

be **straightforward** and/or easy to use;

be **quirky** and **exciting**; not only to **break away** from the usual black injection-moulded device, but to **reflect** Wendy's **personality**;

be **durable** to withstand **accidents** such as drops

be **mass manufacturable**.

The device *could*:

be **easy to clean** (think: gardening, baking);

be made of **more than one material** to **add interest** and personality

have some similar **features** to those **found in smartphones**, e.g. a clearer menu or a home button;

be **priced** within the range of **£60-£89.99** - allowing space for **quality** and **durability**, without compromising on style, cost, or distinctive materials or design features.

The device *would*:

be **cordless** - it appears to be a more **popular layout**, especially for higher-end devices. It would also be more practical for users like Wendy;

have a screen and **keys** - these increase ease of use and allow the possibility of more functions and features;

be on shelves amongst devices such as **landline phones**, in department **stores** such as **John Lewis**, and also **online** in the home electricals section of various homeware suppliers.

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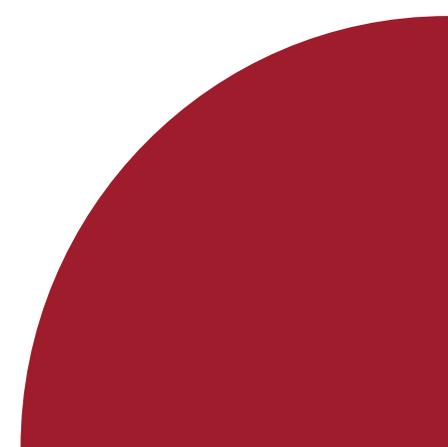
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LANDLINE COMMUNICATION DEVICE

Project Log

RECAP

design brief

*To design a new **landline communication product** that can be installed and used in a domestic living space. It must use known technology and is to be manufactured by a partner company in China.*

what defines a landline communication product?

A device that allows communication between two or more people to converse via audio, video or text, when they are not near enough to talk face-to-face. The information is converted and transmitted over a cable (landline) and reproduced to the user(s) at the other end.

WENDY in a nutshell

Looks for...

durability
quality
affordability
practicality

Interests...

Craft
gardening
baking
reading
socialising

Character...

quirky
practical
organised
moneywise



Wants/likes...

her own craft studio
Joseph Joseph kitchenware
William Morris
John Lewis
Orla Kiely

marketing research summary/initial design specification

The device *should*:

be **straightforward** and/or easy to use;

be **quirky** and **exciting**; not only to break away from the usual black injection-moulded device, but to reflect Wendy's **personality**;

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be on shelves amongst devices such as **landline phones**, in department **stores** such as **John Lewis**, and also **online** in the home electricals section of various homeware suppliers.

EXISTING COMMUNICATION DEVICE



Argos Value Range white corded telephone priced at £4.99. This device is similar to what Wendy currently owns; it is cheap, has limited features, but does its main job - it makes a phone call.



The body is made of white injection-moulded spark finished ABS and the same in grey for the buttons, as suggested by the ejector pin marks (unburred) and recycling symbol in side the handset.

The handset has a cheap, cast iron weight screwed into it to make it feel heavier, increasing the feel of 'quality' and to help the user to position it better against their head.

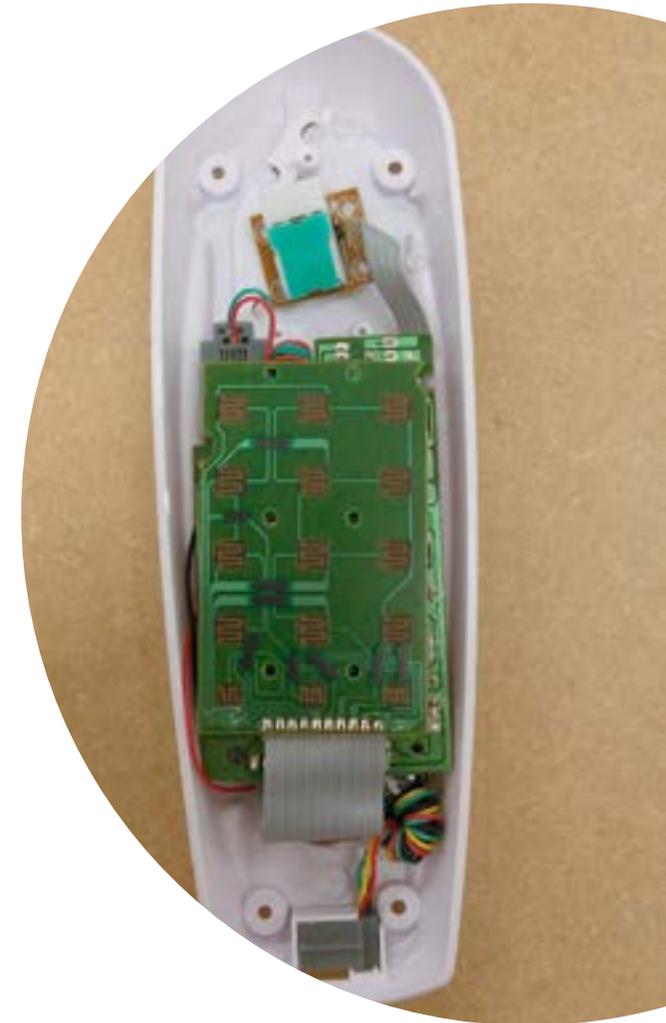
Spaces for the feet, wall mounting hook, and telephone cable have been moulded in - it is possible that the channel for the cable would have been the only feature that required a release feature in the moulding process.



The numbers on the buttons may have been tampon printed. As it is CNC-controlled, it's quick and efficient, thus making it a cheap and sustainable method.

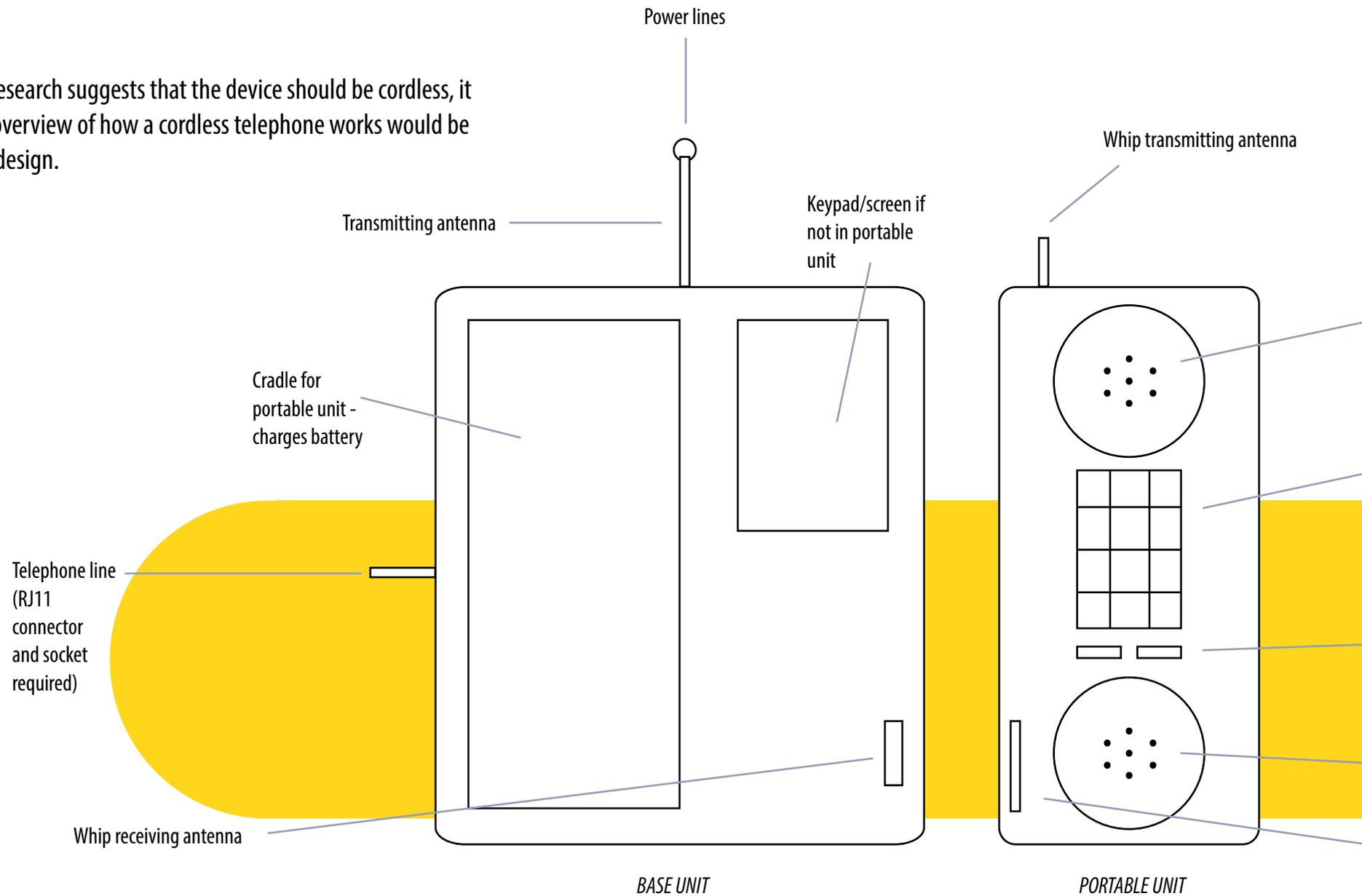


The components appear to be bought in, forcing the phone to be designed around the parts. Bosses and ribs have been designed into the mouldings to aid structural strength to the casing and to provide spacing and positioning of the parts with minimal fixings - reducing the overall cost, too.



THE CORDLESS TELEPHONE

Since the marketing research suggests that the device should be cordless, it was thought that an overview of how a cordless telephone works would be helpful in the overall design.



Speaker

Keypad/screen if
not in portable
unit

Start/end call keys

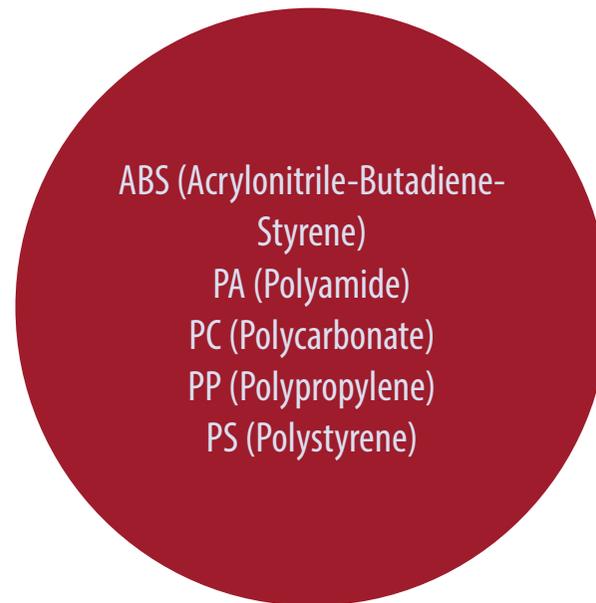
Microphone

Receiving antenna

A cordless telephone consists of two units: the portable unit (handset) and the base. The handset and the base are connected by low power radio signals, instead of a connecting wire, as found in corded telephones. The radio link is completed by the transmission of a carrier that is frequency modulated (FM) with the information to be transmitted (Bigelow, 1991).

WHICH TYPE OF PLASTIC?

The market research outlines that the phone is to be injection moulded, to keep costs low. As most injection moulding processes and their products use thermoplastics, it seemed sensible to make a choice from the following types:



It was decided that it would be appropriate for the majority of the phone to be made from ABS, due to its high impact resistance and toughness. It's easily available, and is safe to humans under regular handling. As with many other plastics, it is easy to clean/wipe down, too.

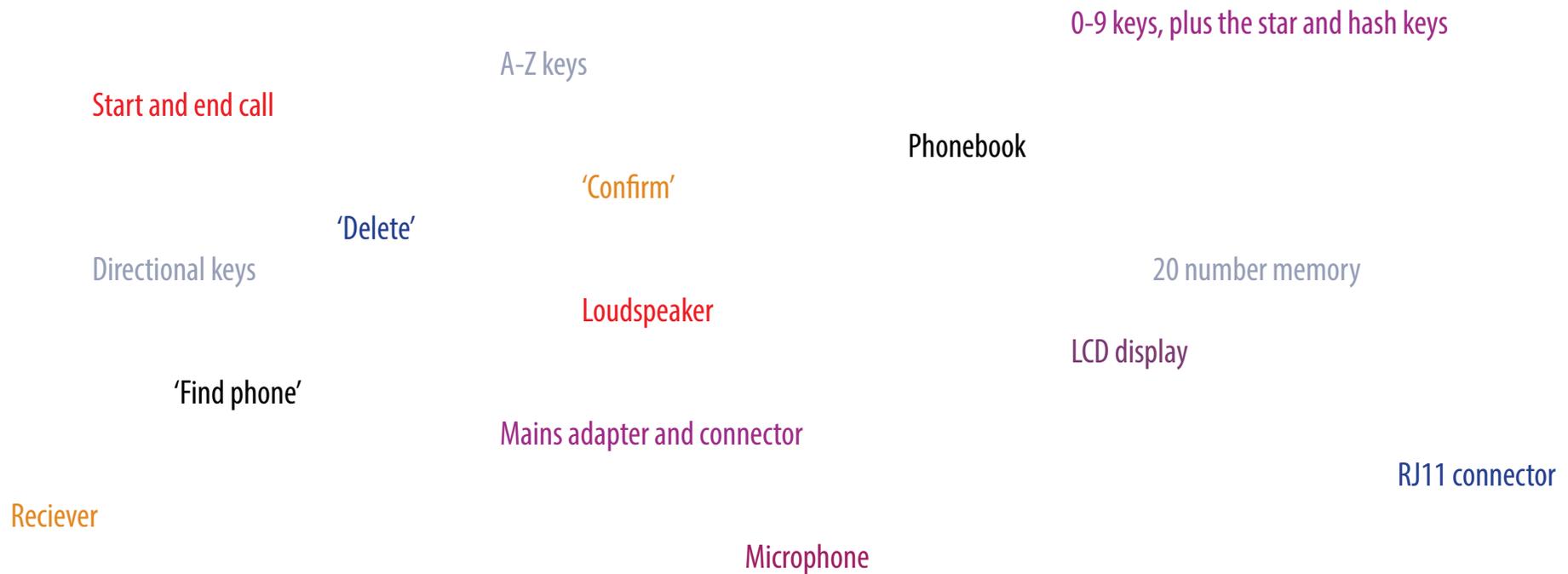
To add interest, ease of use and increase its durability it was initially thought that suede coating could be used as a finish, or silicone rubber as some sort of inlay for the decided features, due to the difference in texture/feel.

As this is a precise, controlled method, minimal wastage can be produced, making it a relatively sustainable process in terms of plastics. The use of plastics itself isn't such a sustainable choice, but if designed correctly, the product should be able to be disassembled, sorted and recycled/disposed of in a sensible way.

PROPOSED FEATURES

Considering the target market (comfortably off families in modern housing), their lack of use of technology and the age group (55+) it is best that the design has minimal features, focussing more on the ergonomic and aesthetic design of the product.

Of the many available (physical) functions/features, it was decided that the following would be included:



exploring CONTRAST

It was decided that the best way to represent 'quirkiness' in this product was to apply the concept of *contrast*. Here are possible ways that contrast can be represented through:

MATERIALS

A different material to a regular, injection moulded plastic device, such as concrete or a wood (e.g. ash)

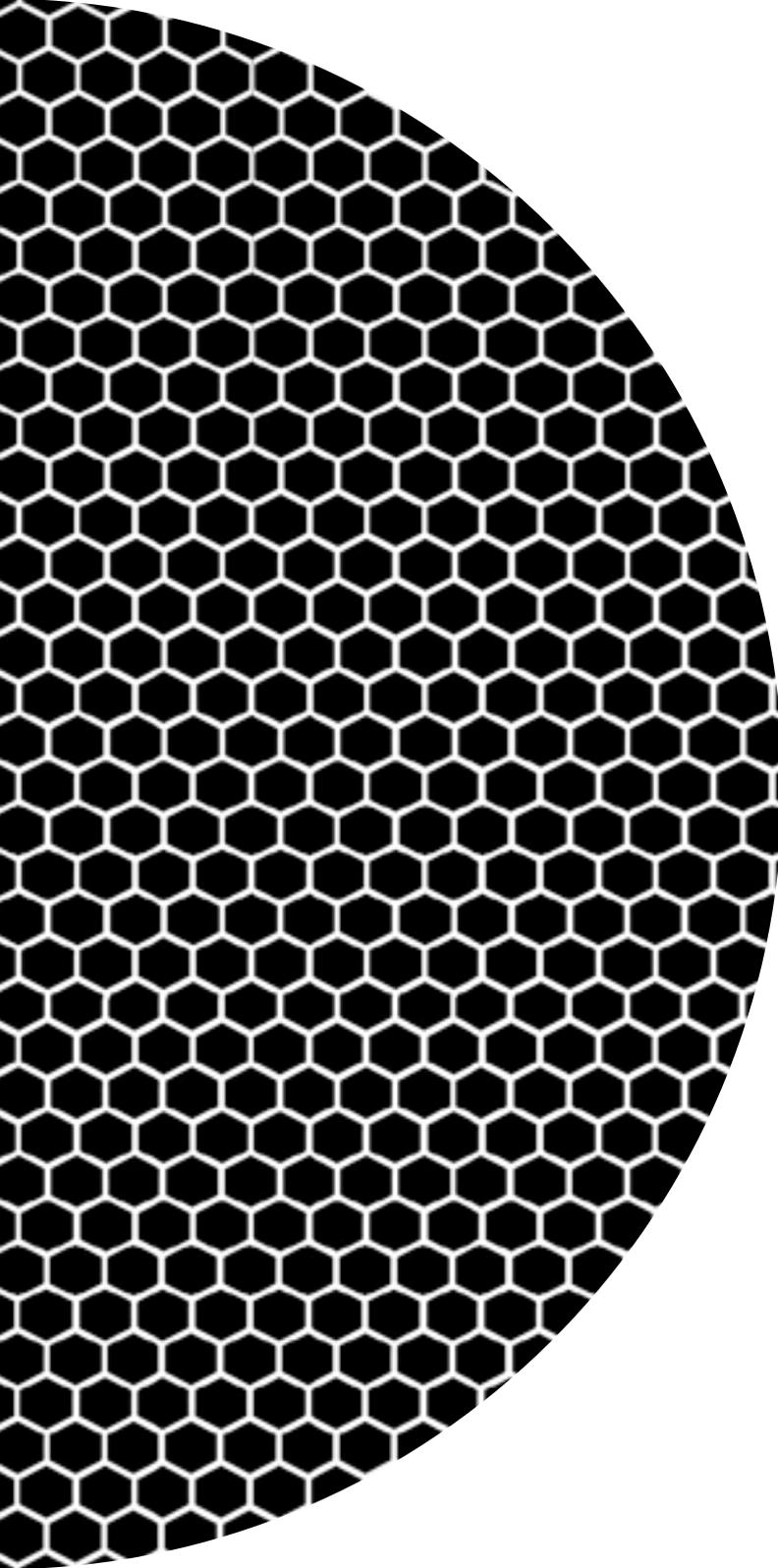
Two or more completely different materials (See Texture)

COLOURS

Colours of opposite ends of the colour wheel, for example red and green. (Note- various tones and shades can be included, too)

Irregular colours to those repeatedly seen in devices found in the target price range (£60-£89.99), i.e. not black or silver!





TEXTURES

A difference in textures could be used, within the keys, the handset or throughout the handset and base such as:

Soft Smooth Rippled Sharp Rough
 Rubberised Grainy Coarse

SIZE

This factor could be used for aesthetic purposes, such as the overall form of the phone, or as an advantage for more practical or ergonomic purposes, such as comfort when holding the handset, or implying the order of importance of functions, although this could be said for most other factors

FORM/SHAPE

A difference in shape or form could attract the consumer's attention, make it stand out as another feature in a room (like a sculpture)

There could be a smooth or sharp transition between the differences, depending on the desired subtlety.

Phone

Think sewing box:

* -> lots of small things packed into a neat case. -> *

ie. lots of patterns, details hidden away, but still an attractive sculptural piece on outside.

Comfortable
Modern combinations of different materials

Colors
of materials used!
floral colors

continuous

Naquchi

CES

quirky
unorganised

Practical
Packing
CRAP
Gardening
Brand quality
durability
availability

Materials

Natural - Cork
Sandpaper
NOT WOOD

Metals - chrome (brushed)
stainless steel

Ceramics - porcelain

Polymers - ABS
SILICONE

feature) - handfree
'customisable!'

Colors

Form - must stand for handfree

2-part, Cordless

Shape for shoulder to fit into?

(when you hold between ear + shoulder)

stainless steel + silicone

Porcelain + silicone

maybe not cork?

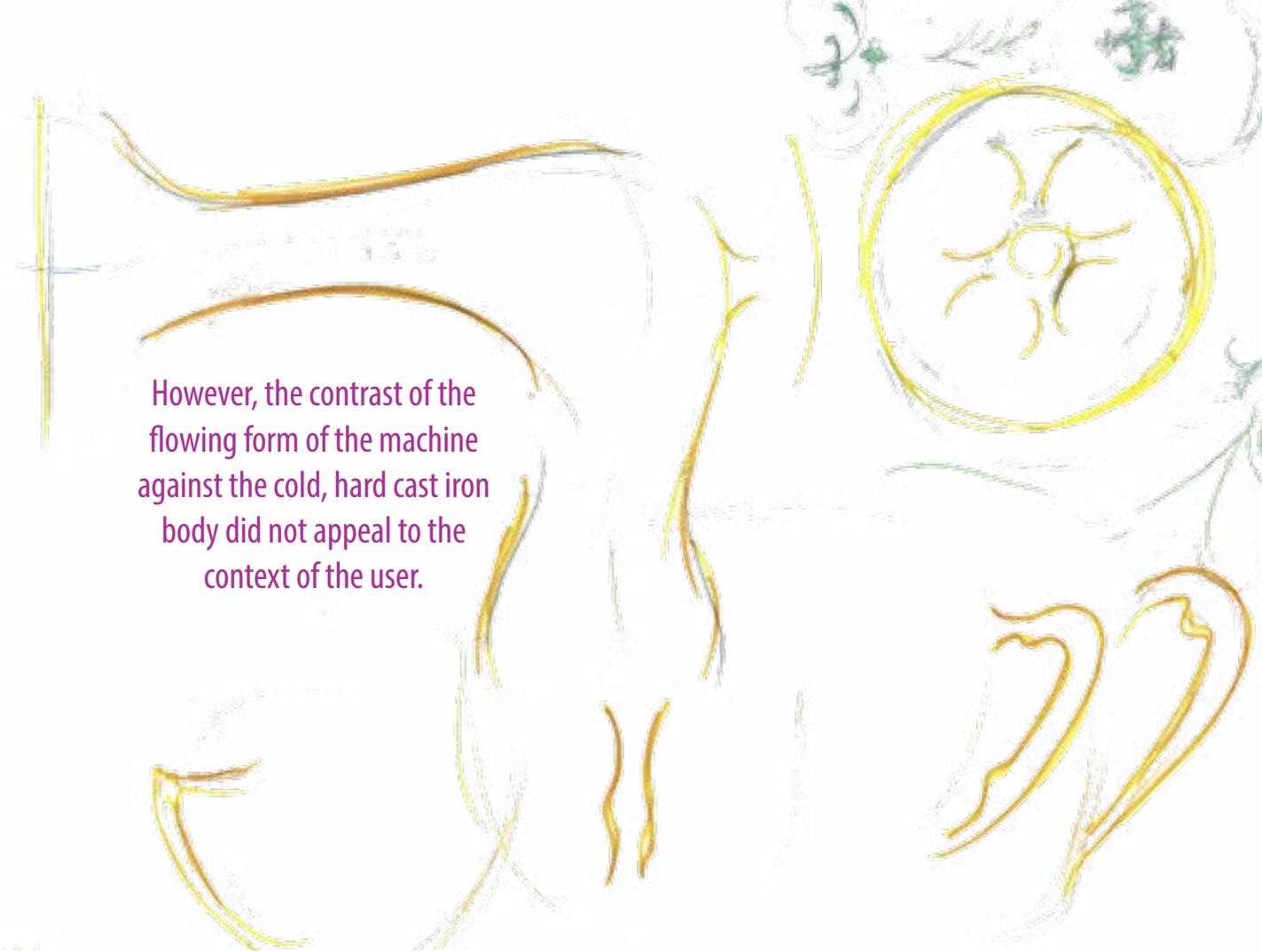
easy to place
durable.

PHASE ONE

sewing machine

As a starting point, objects that Wendy may have had were used as inspiration, such as this Singer sewing machine.

Fig. 1



However, the contrast of the flowing form of the machine against the cold, hard cast iron body did not appeal to the context of the user.

A series of 'blobjects' such as this kept appearing!



sewing box

Fig. 2



Fig. 3



Fig. 4



Further inspiration was taken directly from Wendy - her interest in crafts gave reason to look at sewing boxes.

It was thought that a good way to achieve a quirky character was to have a contrasting 'inside' and 'outside' to the design, similar to how different a sewing box can be inside, compared to the outer casing - such as natural cotton threads inside an injection moulded plastic box.

this idea helped to inform and solidify the format of the phone - having the handset sitting directly on top of the base, which also sits directly on top of a flat surface (e.g. a table).

Handset 'coming out' of the base - allowing for more surface area under the handset/inside the base for contrasting features.



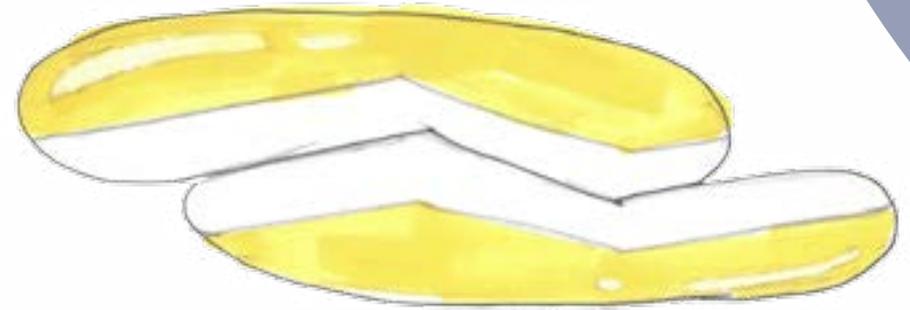
Having the handset sitting in the base seemed to be the most ergonomic way. Think - what if Wendy was in the middle of gardening? What would be the most straightforward way to answer a call? Would it be easy to wipe down afterwards? These thoughts also helped to inform initial material choices.

Should the phone automatically start the call when the handset is picked up? Or should the user have to produce an action to start it? Which is more practical? Where should the screen be placed?

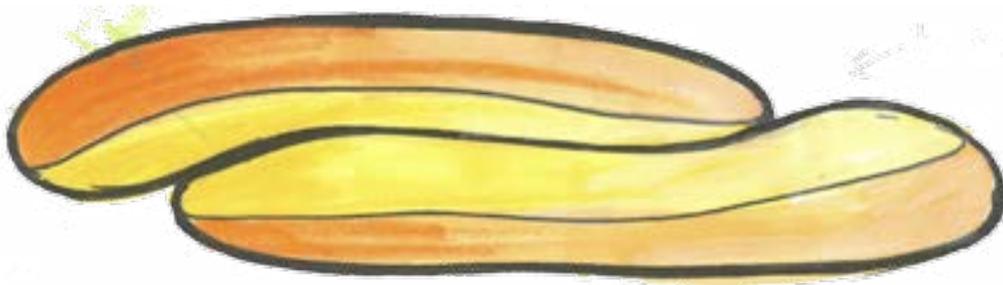
PHASE TWO

studio day

Contrasting colours



Gloss yellow & matt white?



The 'blobjects' were revisited - however this time more organic and flowing.

It was decided that a phone of this kind of shape (bearing in mind the target market) would best be injection moulded out of a high-gloss plastic. This helped to redesign the form - injection moulding would require split lines, which could be used as an advantage by using it as a tool to separate contrasting colours or materials.

The main qualities that Wendy is interested in were revisited in this design:

durability: thicker material, more resilient to damage, e.g. accidental drops

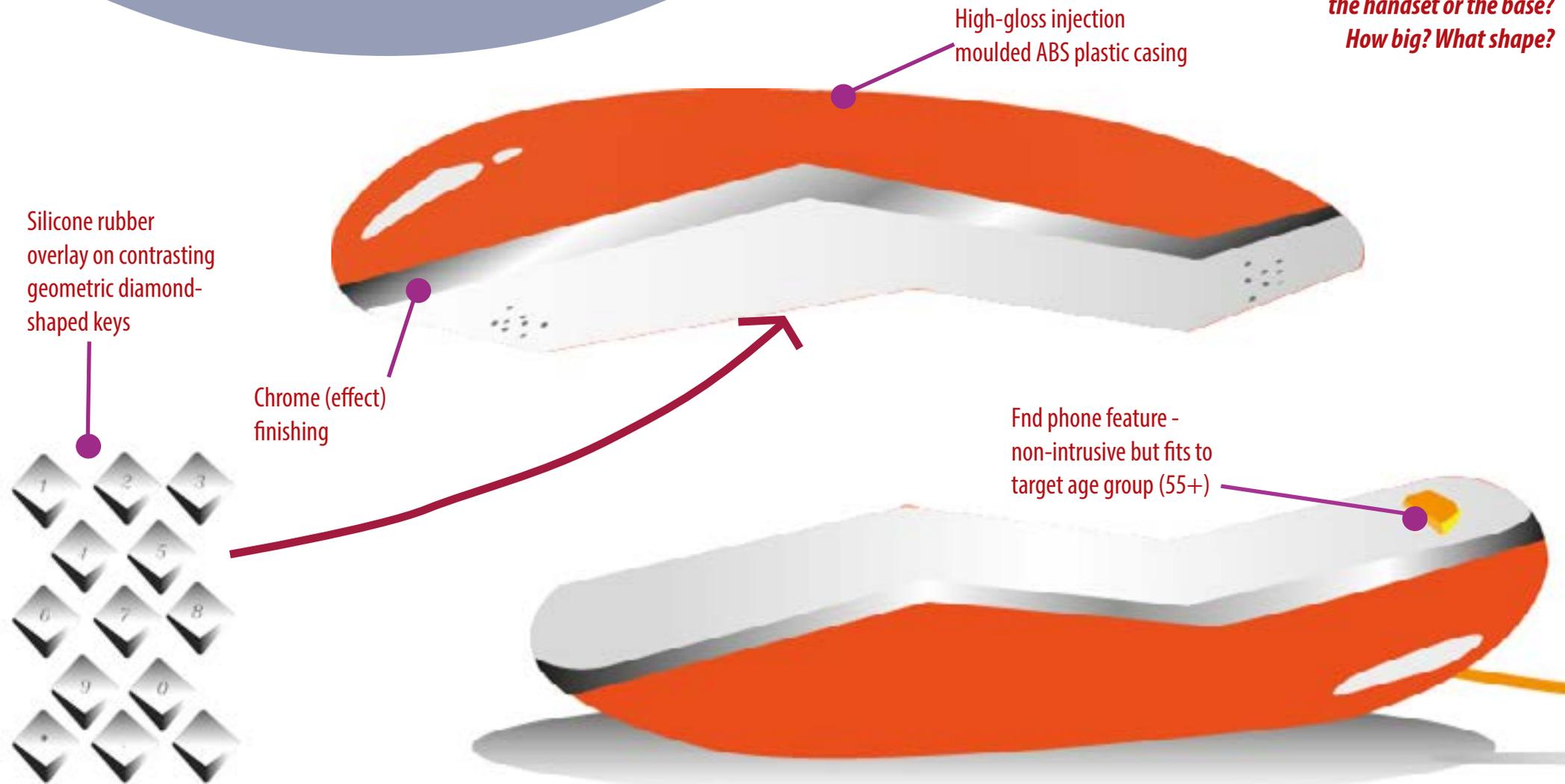
quality: thicker material

affordability: use an easily available material, use mass manufacturing methods to produce, bought in parts

practicality: easy to clean? incorporate silicone rubber - also readily available and easily mouldable. Improves feel and quality of material - think about sound and feel when silicone rubber is touched against plastic.

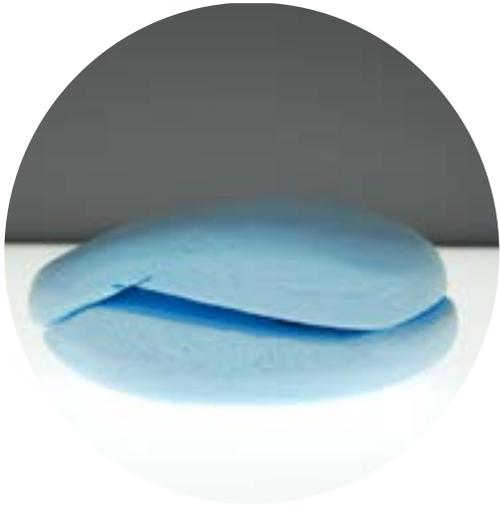
the outcome

**Problem - where should the screen be placed? In the handset or the base?
How big? What shape?**



PHASE THREE

form & texture



This combined the curved form with geometric cuts, but it was too big. Most users had to stretch their hand over the handset.



Here the format was adjusted slightly. The gap between the handset and base allowed for easier hand placement and better positioning when the handset was replaced.

paper folding

It was decided that for easier grip, more aesthetic value and more sculptural value, the design could be improved with geometric forms.

Origami works by Richard Sweeney were looked at, giving inspiration to combine geometric and curved lines into the same form in a fresh, new way.



Testing out paper folding



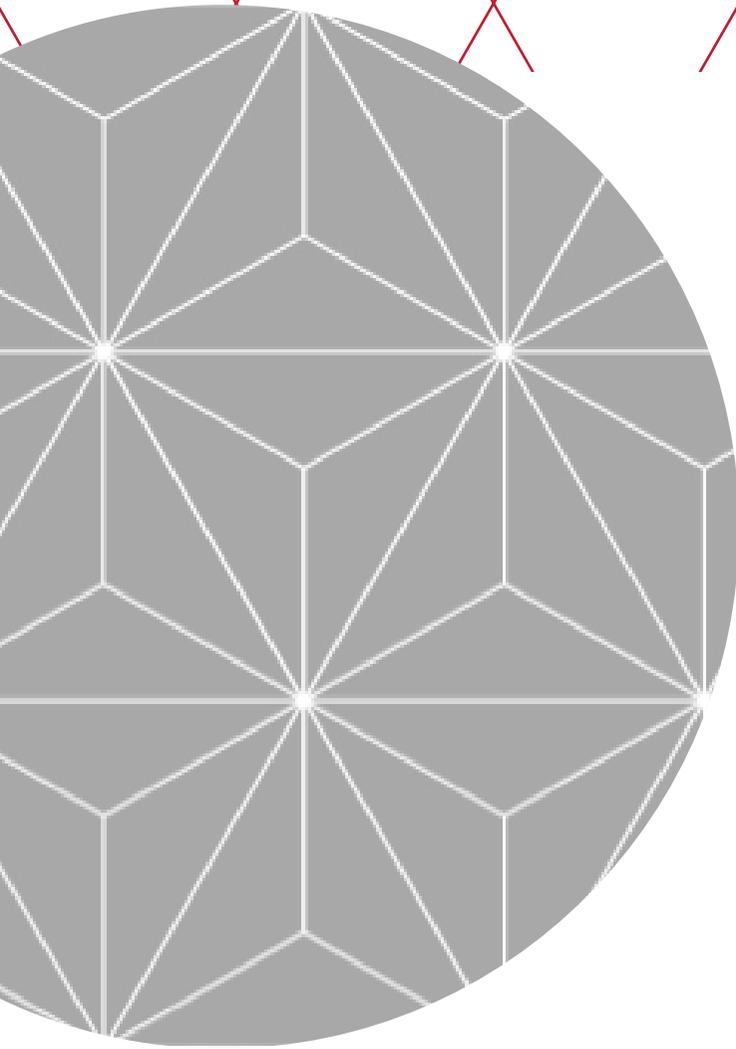
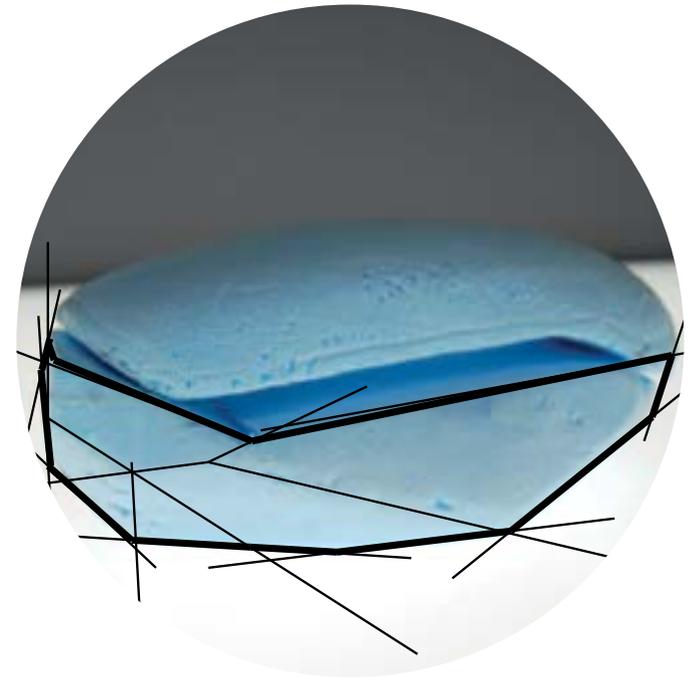
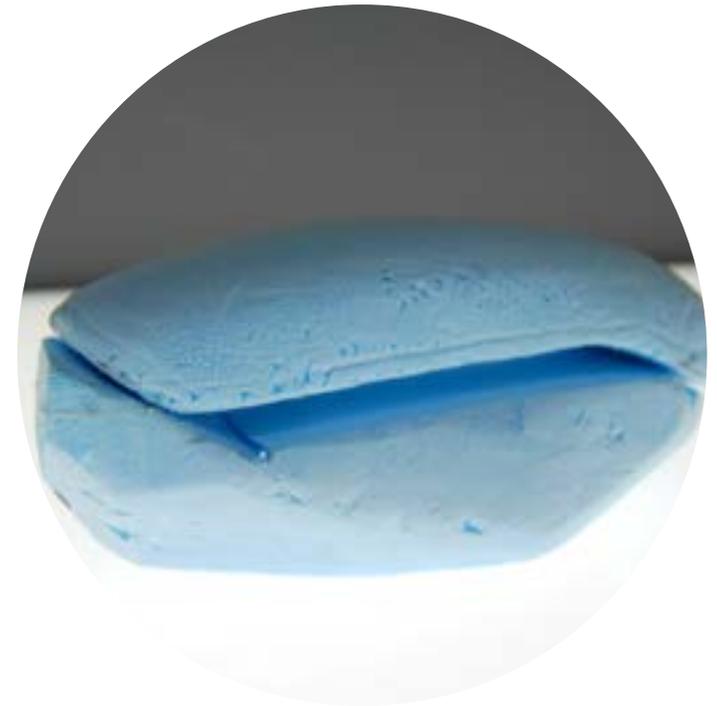
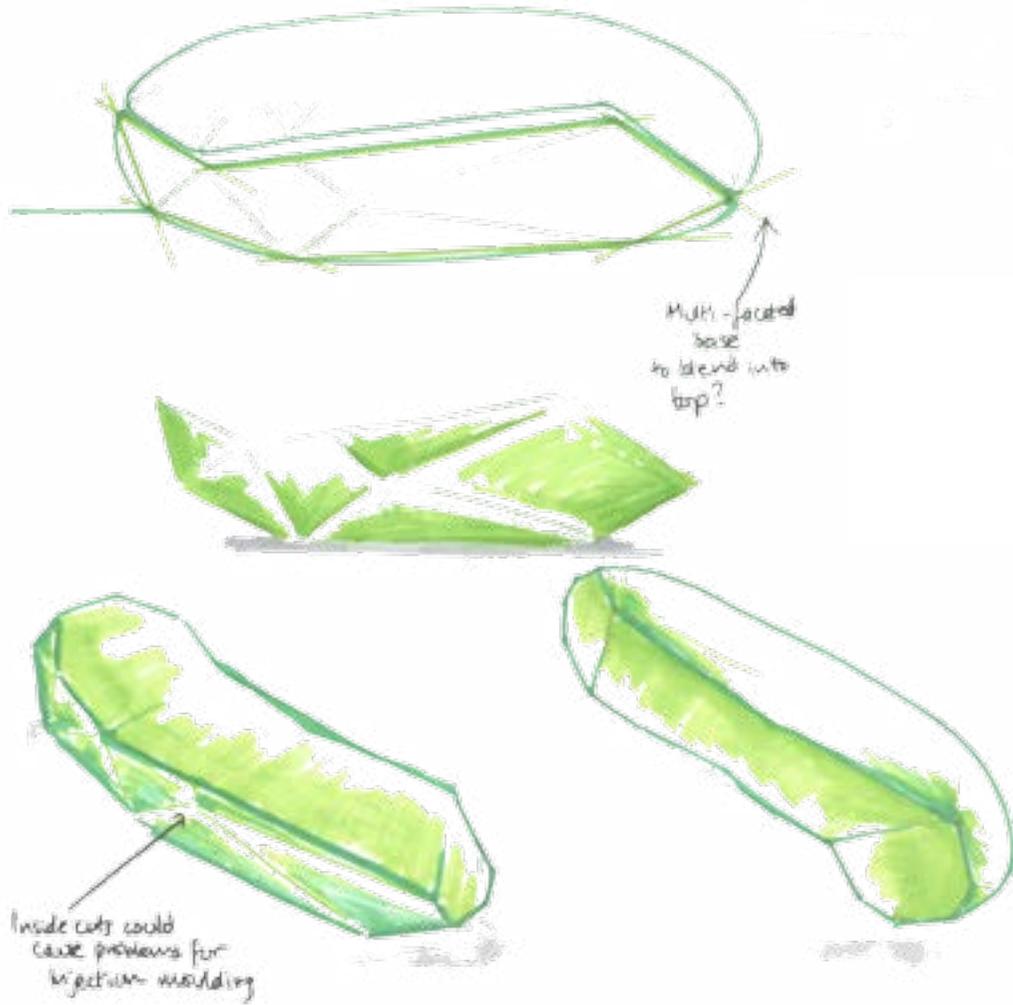


Fig. 8



Testing a combination of paper folding and tessellations - unsuccessfully. The model was weak, lacking in aesthetic form and difficult to manipulate.

applying forms found in paper folding



PHASE FOUR

gemstones



The geomtric cuts lead onto more symmetrical geometric cuts found in gemstones, resulting in a final idea.

Fig. 9



Instead of blending the facets into the top of the handset, more were added, attracting the user's attention by causing sharper reflections when caught in the light; a major characteristic found in gemstones and jewels.

final idea



Handset

Base

Using contrast by placing randomly cut facets, in a symmetrical manner.

PROTOTYPING & WIRING



CNC model no.1 (finally!) of the final idea. This model allowed more thought towards designing the the way the cables fitted in.



Spacing for the telephone cable, but none for the mains cable.

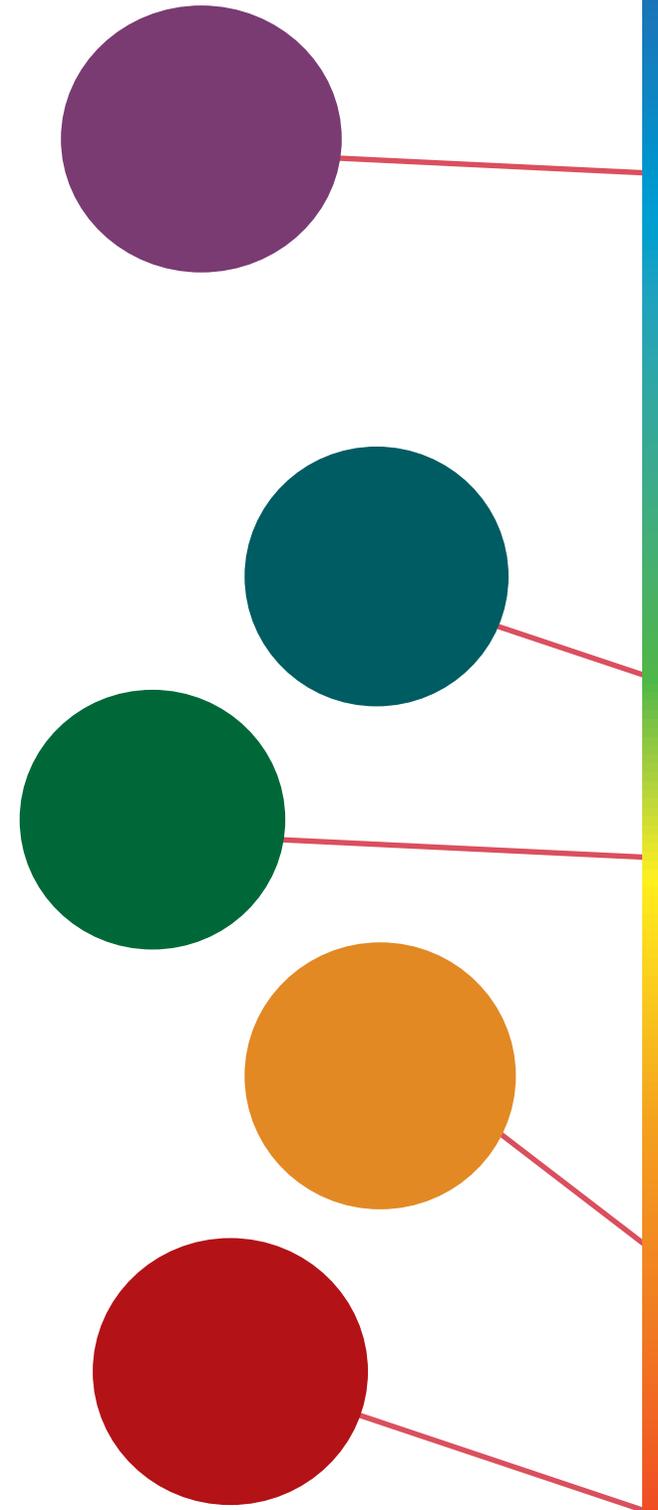


Deeper channel and moulded-in spaced for the telephone cable and mains cable (to be made so it is fitted. Removability would be unnecessary on a small appliance such as this).

COLOURS



To fit with Wendy's quirky character, it would be appropriate to choose bold colours for the device. Maybe make it available in more than one colour to reflect the broad range of colours found naturally in gemstones?



DISPLAY

It was first thought that the monochrome display (which was decided to be placed in the base) would be black on white. After some research, the idea was changed to a backlit white on black display, omitting the need for a frame over the screen; the whole base could be covered in a black filter instead. This made the design more flowing and smarter.



clock May 14, 2012 03:32 by author Admin
LCD displays are everywhere: on our phones, in our cars, on our tablets and in the workplace. The future is dependent upon the development and use of this technology, and the market for consumer, technical and manufacturing products that utilize these displays will only expand. The technological advances behind LCD displays over the past few years have been nothing short of remarkable, and this will be a trend in the years to come.

LCD Display Types

There are many different varieties of LCD displays, and you should choose a product with a display that meets your needs. If you are manufacturing products with LCD display modules, you should be aware that not all LCDs are created equal. Some have better functionality, some have better power usage, and some are less expensive. You will have to weigh these three qualities to determine the best LCD displays for your needs.

Different LCD Modes

There are many different LCD modes. These include:

TN - Twisted Nematic - Low contrast, monochromatic, low power use, low cost

STN - Super Twisted Nematic - Mid-contrast, monochromatic, low power use, slightly higher cost

FSTN - Film-compensated Super Twisted Nematic - High-contrast, duo-chromatic, low power use, mid cost

CSTN - Color Super Twisted Nematic - High-contrast, full-color, mid power use, slightly higher cost

DSTN - Double-layer Super Twisted Nematic - Super High-contrast, full-color, mid power use, high cost

TFT - Thin Film Transistor - Highest contrast, best color, mid power use, highest cost

Backlighting

There are three types of backlighting for LCD displays: LED (Light Emitting Diode), CCFL (Cold Cathode Fluorescent Lamp), and EL (Electro-Luminescent).

LED backlighting offers both monochromatic and color displays and is not very expensive, but it uses the most power and has only a middling quality as far as contrast and color rendering.

CCFL backlighting uses less power, lasts longer and has higher contrast and color rendering, but it is extremely expensive.

EL backlighting uses even less power, is very cheap, but doesn't last that long and is poor to middling in color and contrast quality.

Polarizer

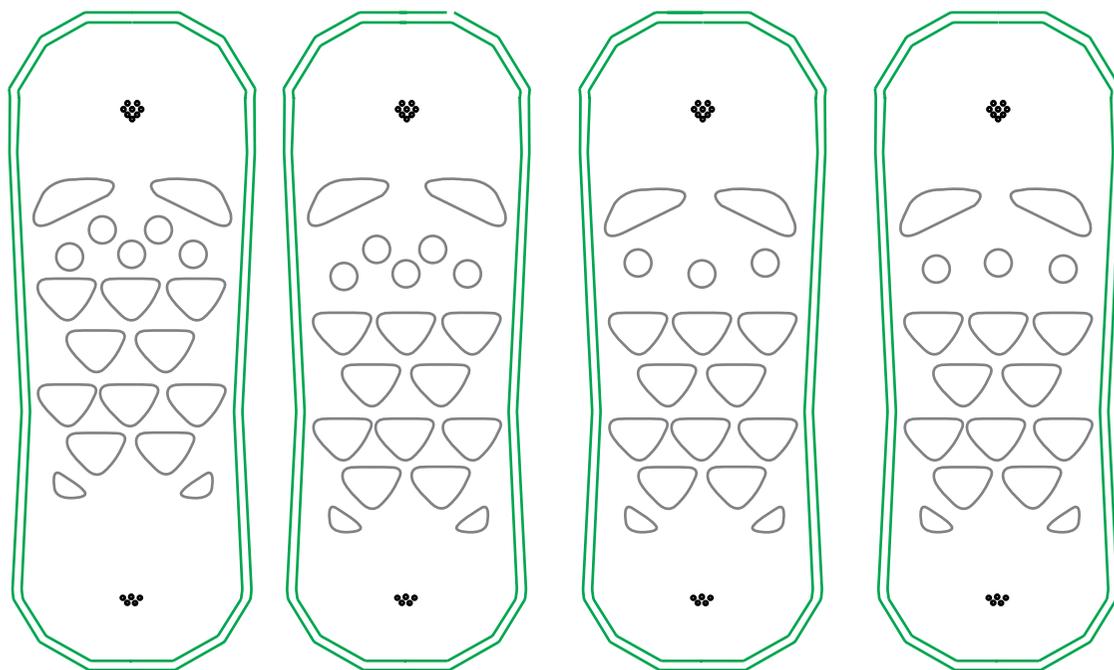
There are three different polarizer types for LCD display modules: transmissive, reflective and transreflective.

Transmissive displays use a backlight to provide light to the liquid crystal display. They are inexpensive, offer high-quality visual displays, but tend to use a lot of power.

Reflective displays use ambient light sources for the LCD display. They are inexpensive, use little energy, but tend to provide poorer quality display, and they can't be used in low-light environments.

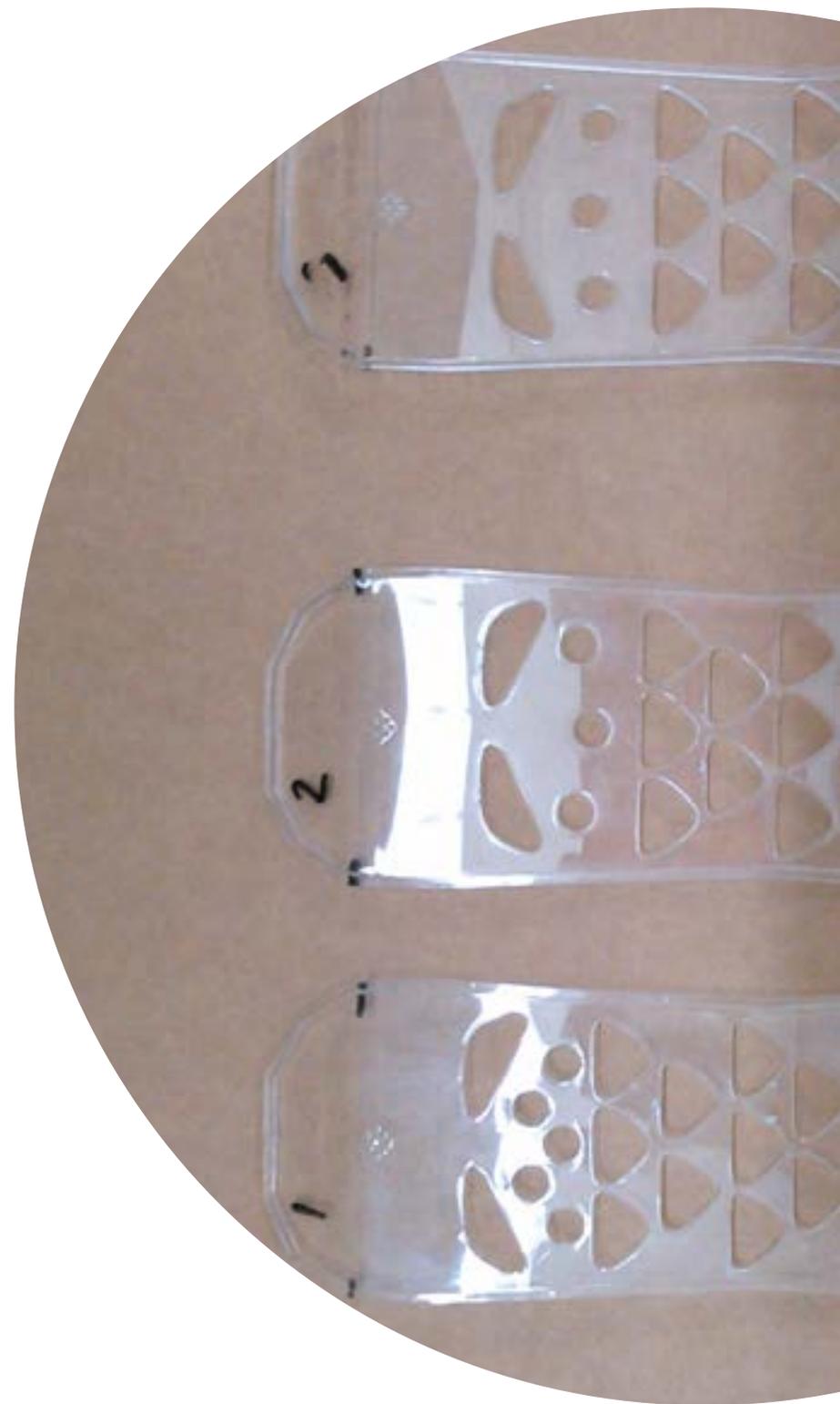
Transreflective displays use a mix of transmissive and reflective technologies. They are expensive but provide the energy cost savings of reflective displays with the high-quality display of

KEYPAD



Spacing out buttons - bigger space between buttons means that the buttons don't have to be large. This avoids being intrusive to older users without cutting out younger consumers.

Removing unnecessary buttons - (see button designs further on). Cleans up keypad by integrating two/multiple keys into one. Also results in less material use overall.



THE FINER DETAILS

font

Choosing the correct font for the keys was crucial - it had to be clear to read (larger, bolder, clearly and evenly spaced), but not intrusive to older users. It also had to match the style of the phone.

1 2 3 4 5 6 7 8 9 0

1 2 3 4 5 6 7 8 9 0

A B C D E F G H I J

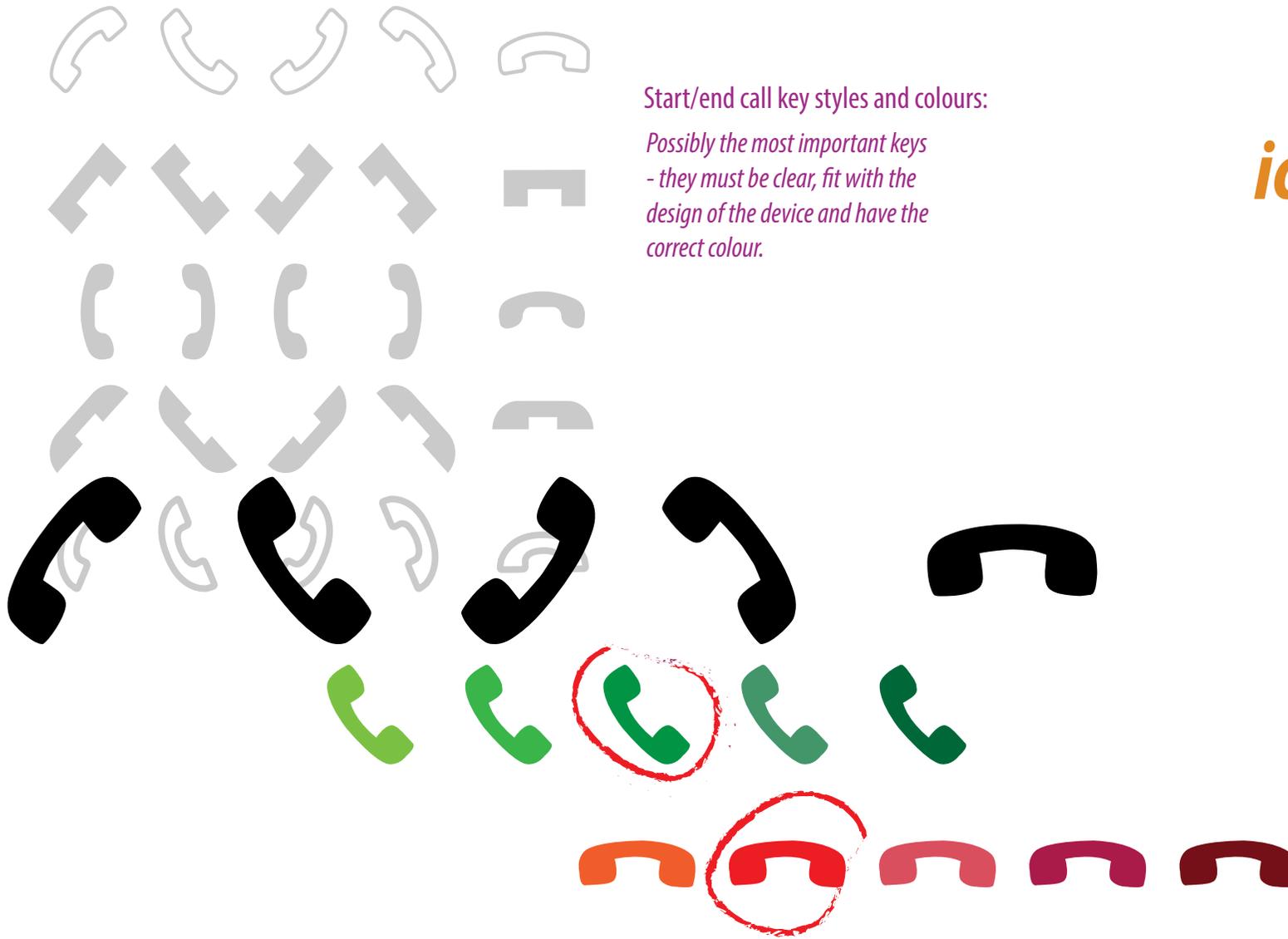
M N O P Q R S

V W X Y Z

chosen font:

'Avenir Next'

1234567890

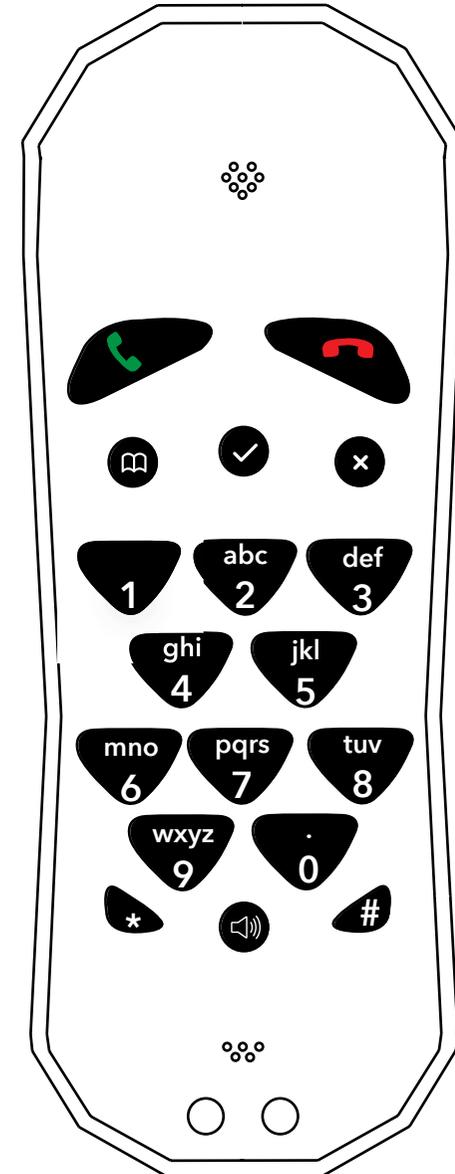


Start/end call key styles and colours:

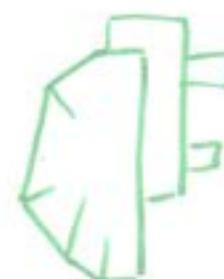
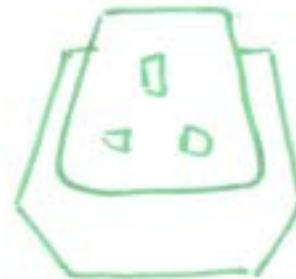
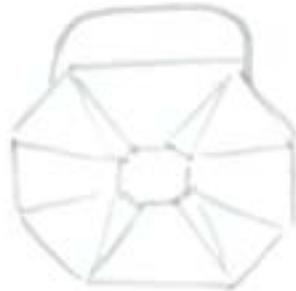
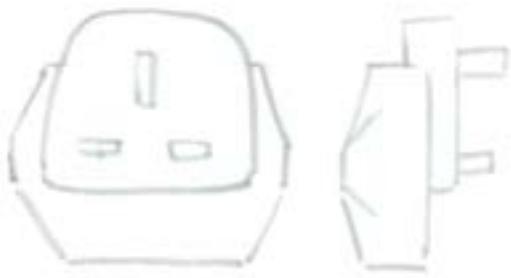
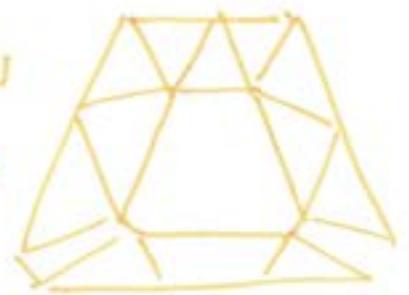
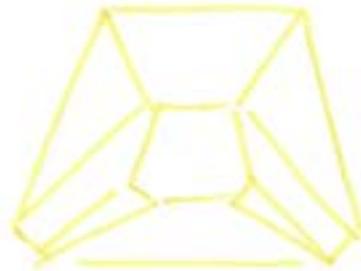
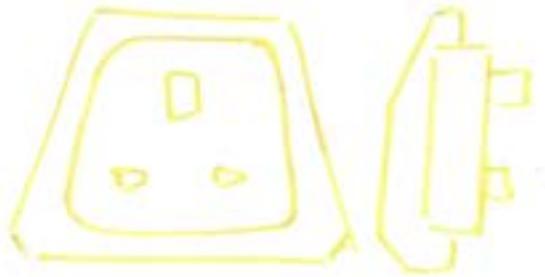
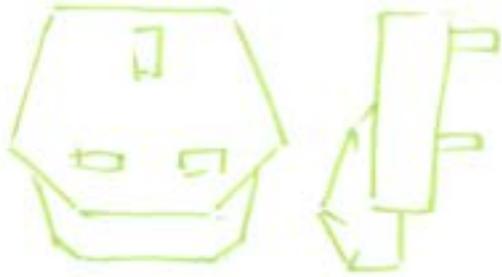
*Possibly the most important keys
- they must be clear, fit with the
design of the device and have the
correct colour.*

icons & colours

Phonebook:



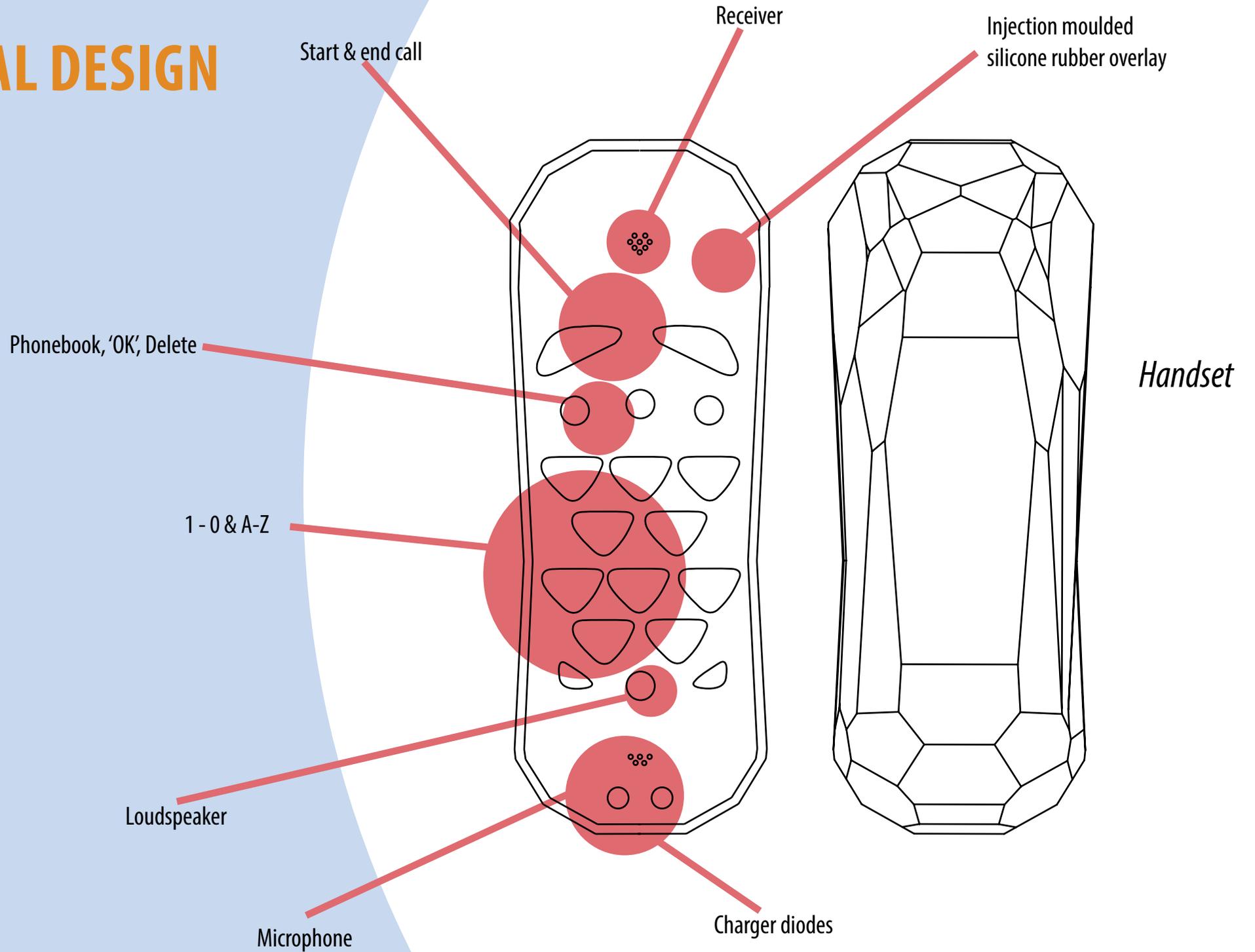
THE PLUG



The adapter for the telephone was designed in such a way that made it a feature instead of something that would be hidden away. It was decided that the colour and style would match the phone.



FINAL DESIGN



1.75mm injection-moulded
high-gloss ABS casing

Built-in LCD backlit monochrome
display (white on black)
Clear acrylic overlay

Base

'Find my phone'

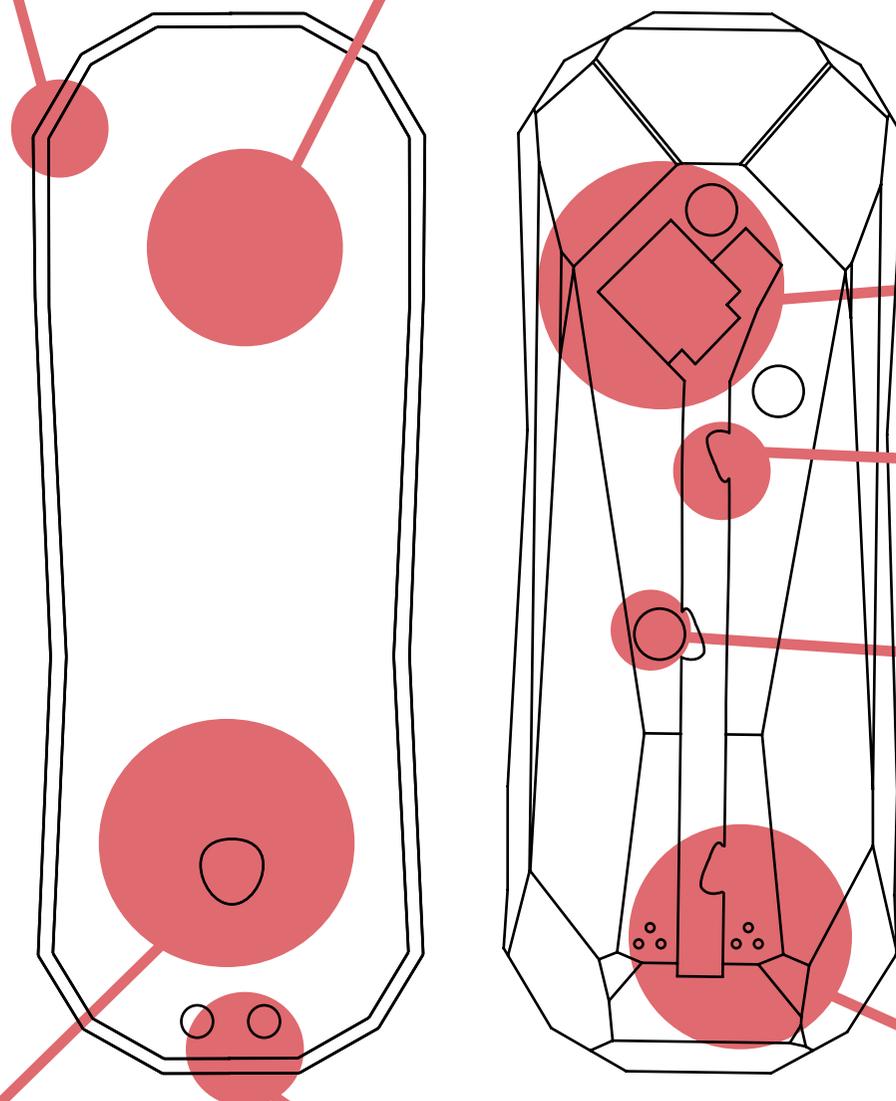
Charger connectors

RJ11 telephone port & space
for fitted mains cable

Channel for telephone
& mains cables, held in
with moulded in grips

Rubber feet (x3)

Speakers



USING THE PHONE

The minimal features on this design simplify it's use.



To answer a call, pick up the handset and press the start call key. To end the call, press the end call key (which is a slightly different shape so a difference can be felt too) and put the phone back to charge. Built-in magnets will help to guide it into place too.

To make a call, pick up the handset and dial the number, checking the screen in the base. Press the start call key.

To choose a contact from the phonebook, press the phonebook key and move up/down. Press the confirm key. Press the start call key.

To add a new contact, press the phonebook key, and move up to the line that says 'new contact'. Press the confirm key. Type in the name, then the number. The keys will switch from letters to numbers automatically.

'FIND MY PHONE' FEATURE



*"I've left the phone
somewhere in the house and
I can't remember where!"*



Press the 'find my phone' key in the base.
The phone will ring, enabling the user to
locate the handset by sound.
The ringer will automatically switch to
loudspeaker to make it easier to find.



"Found it!"

MANUFACTURING

The **primary method** for mass manufacturing this phone would be **injection moulding**. This can be seen as an **advantage**, as although the tooling may be expensive to produce, the overall cost is effectively cancelled out due to the sheer amounts produced.

The **outer case**, **inner handset** cover and plug:

Ribs and **bosses** would be **moulded in** for structure, assembly and to save money and processing on extra tooling. A **release feature** would be required at the bottom, and in the ends of the base for the snap fittings, however. The plug would be moulded in two separate parts.

The **acrylic screen** cover would presumably not need any release features.

Silicon rubber overlay: the moulding of this part would be straightforward, but **in-mould decoration/film insert moulding** would be necessary for the **symbols** in the keys. This method has been chosen over tampo-printing as it **lasts much longer** - tampo printing would wear away relatively quickly, thus **reducing** the **durability** and **quality** of the product.

Internal components would be **bought in**.

Wire: this would be coated in **matt PVC**.

'Gemstone' colours



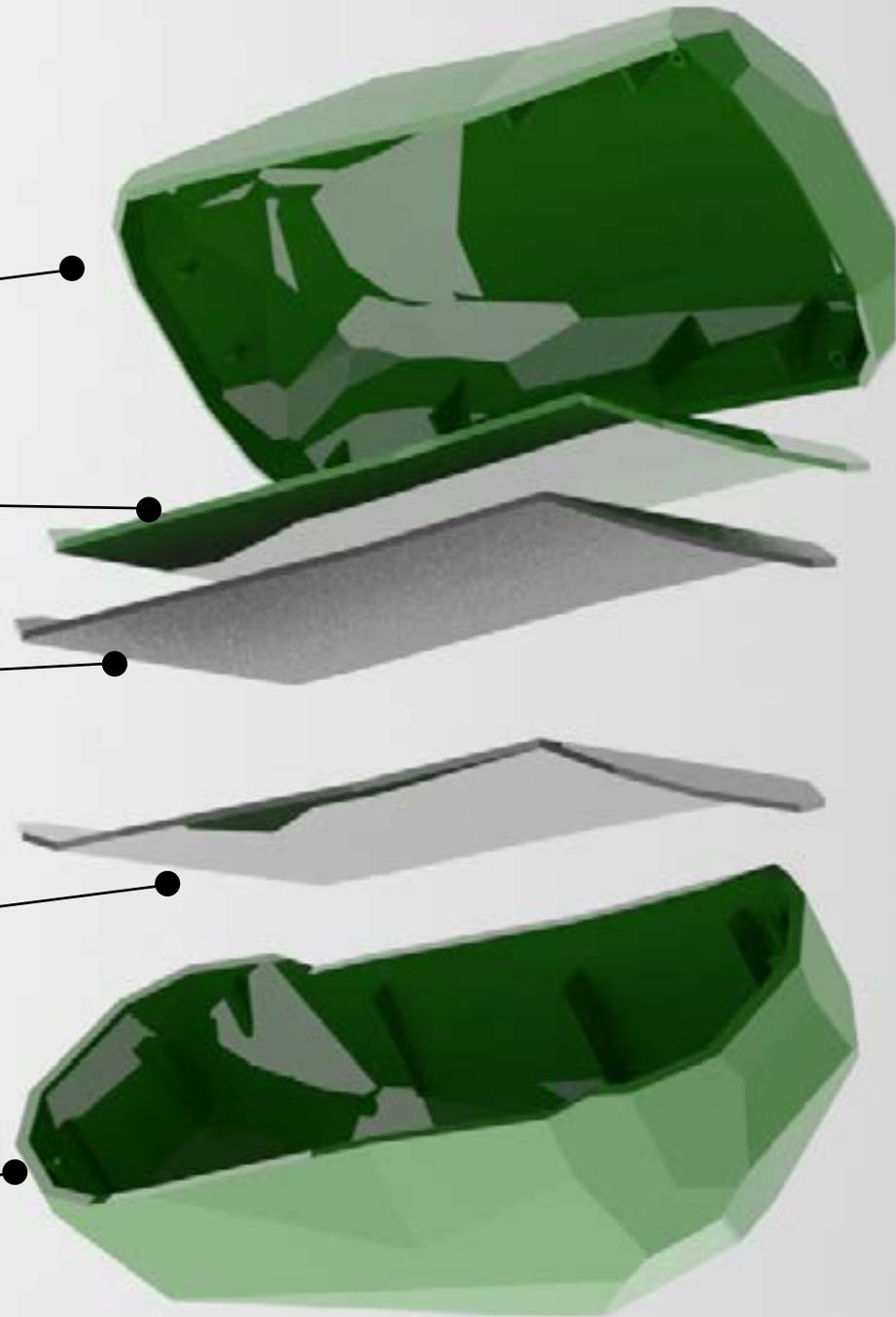
ABS handset casing

ABS handset components cover
(screwed into moulded bosses)

Silicone rubber overlay (glued
to components cover)

Acrylic case cover - doubles up as
screen filter - snap fitted in at ends

ABS base casing







Jenny calling
01234 567891





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Imagery (figs)

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