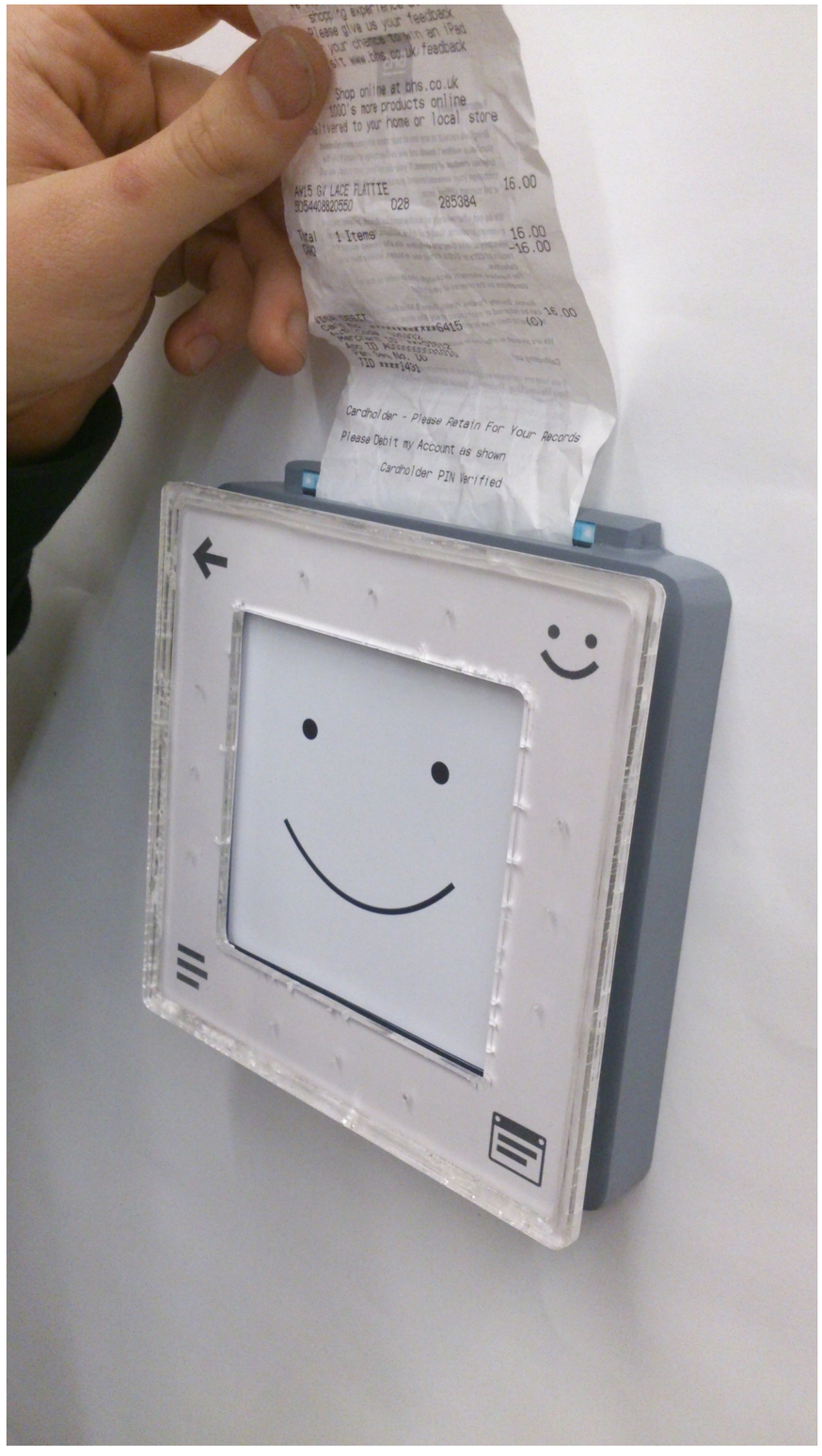
PRODUCT SPECIFICATION

terry

PHYSICAL DEVICE

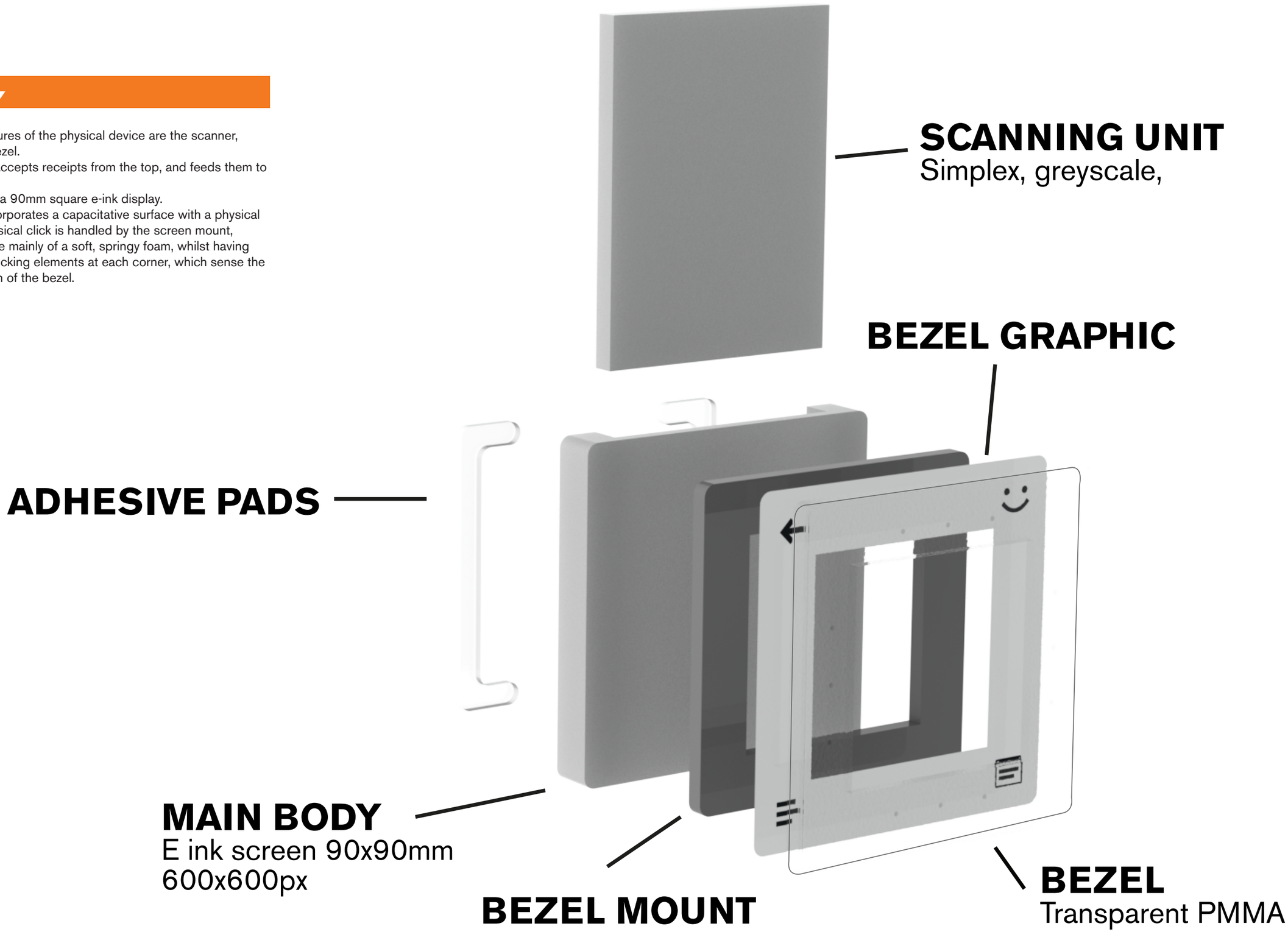


Team Hot Dog Waste Not, Want Not

PHYSICAL DEVICE

TERRY

The main features of the physical device are the scanner, screen and bezel.
The scanner accepts receipts from the top, and feeds them to the bottom.
The screen is a 90mm square e-ink display.
The bezel incorporates a capacitative surface with a physical click. The physical click is handled by the screen mount, which is made mainly of a soft, springy foam, whilst having mechanical clicking elements at each corner, which sense the full depression of the bezel.



TERRY DEVICE PDS

Dimensions

Frontal : 145 x 145 mm
Bezel : 27.5 mm
Screen : 90 x 90 mm
Thickness : 35 mm

Team Hot Dog Waste Not, Want Not

Standards and Specifications
Low Voltage Directive 2006/95/EC
Electromagnetic Compatibility Directive 2004/108/EC
Restriction of the Use of Certain Hazardous Substances Directive 2012/65/EU BS EN 55014-1:2006+A2:2011 Electromagnetic compatibility. Emission.
BS EN 55014-2:2015 Electromagnetic compatibility. Immunity.
BS EN 61000-3-2:2014 Electromagnetic compatibility. Limits.
BS EN 61000-3-3:2013 Electromagnetic compatibility. Limits.

Performance
Scanner should be simplex, sheet-fed with contact image sensor.
Scanner should output images with a bit depth of 8-bit gray-scale.
Scanner should have a Scanner should have a minimum to maximum paper width range of 50 - 90 mm.
Scanner motors should have a no load speed of 60RPM.
E-Ink screen should have a resolution of 600x600, 300dpi.
E-Ink screen should have a contrast ratio of 10:1.
Momentary push button switches should have an electrical life of 50,000 cycles.
Capacitive bezel should have a positional accuracy of within 5% of true position.
The product should be lightweight.
Must weigh less than 0.4kg.
The product should contain a lithium-ion battery rechargeable by mains supply.
Should have a battery capacity of 4.5Ah.
Should have a battery voltage of 3.7V.

Environment
For domestic indoor use worldwide.
Must be able to operate in temperatures between 5 - 44°C. Should be water resistant.

Life in Service:
Should withstand an operating period of 0.30 hours uninterrupted use per day for 2 years.

Target Costs
The product should have an end user cost of £90 in the UK.
The cost of manufacture should be less than £30.
The cost of packaging and shipping should be no more than 15% of the manufacturing cost.

Quantity
1,000,000 units per year.

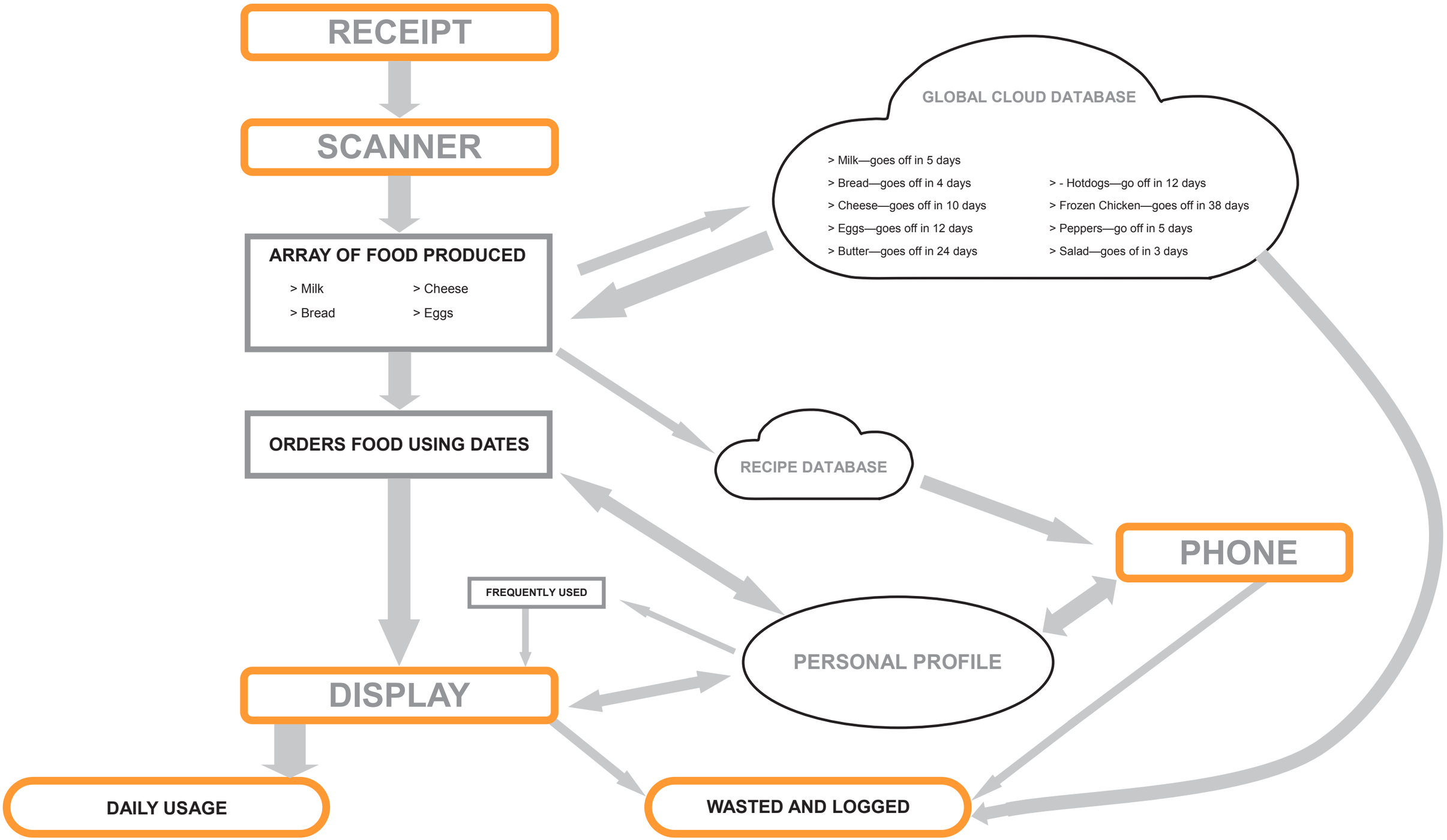
Maintenance
To be maintenance free except for removal of dust when needed.
Parts requiring dusting should be accessible with specialised tools.
Spares should be available for 2 years after the product is replaced with a newer model.

Packaging
Packaging should be visually appealing.
Packaging should be easily stacked for transportation and storage.

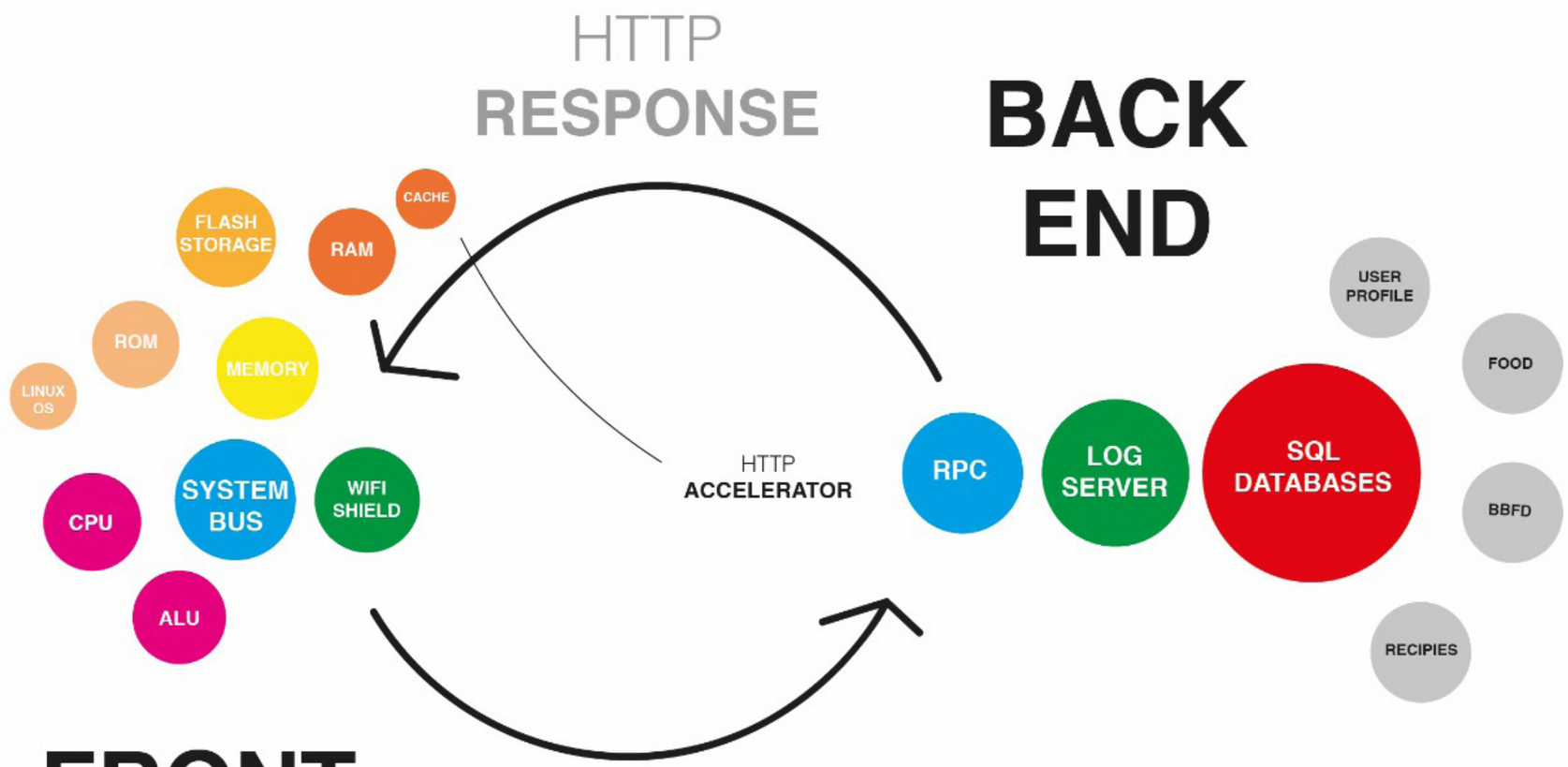
Aesthetics:
The product should be visually unobtrusive and simple.

Ergonomics:
The device must require one-handed operation.
The device must be operable by left-handed and right-handed users.

DATA DESIGN


RECEIPT
SCANNER
ARRAY OF FOOD PRODUCED
> Milk
> Cheese
> Bread
> Eggs
ORDERS FOOD USING DATES
DISPLAY
DAILY USAGE
FREQUENTLY USED
GLOBAL CLOUD DATABASE
> Milk—goes off in 5 days
> Bread—goes off in 4 days
> Cheese—goes off in 10 days
> Eggs—goes off in 12 days
> Butter—goes off in 24 days
> - Hotdogs—go off in 12 days
> Frozen Chicken—goes off in 38 days
> Peppers—go off in 5 days
> Salad—goes of in 3 days
RECIPE DATABASE
PERSONAL PROFILE
PHONE
WASTED AND LOGGED

TECHNICAL SYSTEM



SYSTEM DIAGRAM

LINUX OS The device will use a custom, propitiatory operating system based on the Linux kernel, which will allow us to interface with the hardware, whilst allowing us to create custom interface design. Linux is open source, and can therefore be modified as we wish for free.

DATA ELEMENTS

RPC - Remote Protocol Controller
This allows the user to access database and acts as a front door to the service.
e.g. Thrift - good because works across languages

Log Server
This searches the databases for the required data.
e.g. Scribe

Gate Keeper
Acts as a gate to the service and programmers to test out new concept without shutting down whole system.

SQL Databases
Where data is stored In Servers
e.g. MySQL

HTTP Request/Response
How information is transferred over the 'Internet' from the client to the server

Memory Cache
Relieves Strain on Back-end by storing some things in the RAM of the used product.

DEVICE PROCESSING

Memory (Storage)
Storage of data & program

Cache Registers: small, fast memories
General purpose: store arbitrary data
Special purpose: used to control the processor

Instruction decoder
Translates current program instruction into a set of control signals

Arithmetic logical unit:
Performs both arithmetic and logical operations on data: add, subtract, multiply, AND, OR ...

Control Unit
Control units (CUs) receive signals from the CPU, which instructs the control unit to move data from microprocessor to microprocessor.
The control unit also directs the arithmetic and logic unit.

System Bus
Data exchange between other components.

Wifi Shield
Allows access to http servers through wifi in users domain

MACHINE LEARNING

RECEIPTS

Instead of requiring large, bureaucratic management systems, Terry learns as much as it can from its own users. By asking for small bits of information of users, infrequently, Terry can inspire its whole user-base to do much more good.

Receipts are the primary input for data, and these can be easily input via the receipt scanner which makes up part of the kitchen device. Terry reads the short phrases which represent the food items, and checks these with the database of known food items.

If a match is not found, then it will politely ask the user to input a description and size for the item. Although this sounds like an inconvenience, we are aware that the large majority of food items will be input in a very short space of time, this in fact can be built up during a small scale beta trial. for example.

What the machine learning system does in this case then, is prevent the need for a huge management team to see over the food lists, as brand new items will be simply input by the first person to buy. There would be scope to allow say, the next 10 users to verify this action before the database entry makes it into the comprehensive database.

Tesco were at one point selling 90 000 items in their stores, so we will assume there are 1 500 000 unique receipt codes in stores right now. That means our data system will have to cope with:

1 500 000 unique scan codes
150 000 unique items
150 000 best before date predictions

Assuming a scan code is a maximum of 25 characters long:

e.g. “MCTSCH_MCRN_CHSE_250G_____”

This will take up 25 bytes of data.
Therefore, all unique codes will take up 37 500 000B
Allowing for the future, say with 3 000 000 unique codes, would mean we need to store 75 000 000 B

This is only specific to the UK, an international (first world) system might require storage of thirty to fifty times this size, or around 375 000 000 B of data.
Data is more complex than this, it has identifiers, tags et cetera, so assuming the actual data use is three times the size, this is around 11 250 000 000 B of data.

Regionally, the above calculation works out an entire regional database would need 225 000 000B dividing successively by 1024, this means we have:
219 727 kB, or
214 MB.

We can then assume that the entire database, including 25 character scan codes, 25 character items & 3 digit dates would be under 1GB of raw data. This could be packaged within the system quite cheaply, as micro SD chips and the like are inexpensive today. This validates that even non-Internet users can benefit. In this case we would ship the kitchen system with an in built database of items. Unfortunately this would be non updatable unless an Internet connection was made. But items could still be manually input.

RECIPES

Recipes will be added via the phone, or by making adjustments on the Terry system. BBC good food has an inventory of ‘over 7 000’ recipes. We will assume there are, worldwide, perhaps 20 000 recipes. It is not feasible for us to set up an editorial system over such a large number of possibilities.

What is proposed is that, in the beta test, users will enter the recipes they use. There will then be a consolidation effort, which may take time, to analyse this system of ingredients and instructions to create a list of basic recipes. For example, an entry for the base spaghetti blognaise, (which has 24 entries on good food) would read in this way

INGREDIENT	QTY.	UNIT
spaghetti	125	g
chopped tomatoes	100	g
onion	0.25	unit
minced beef	100	g
garlic	1/2	clove
oil	1	tsp
beef stock	40	ml
mushroom	X	g
carrot	X	unit
celery	X	stick
olive	X	g
basil	X	g
red chilli	X	g
worcester sauce	X	tsp
red wine	X	ml
mild cheddar	20	g
bacon	X	g
vinegar	X	ml
parmesan	X	g

Xs represent foods that can be added. but are not on this particular recipe.

Users can substitute any of the ingredients for a similar category, or add additional ingredients.

Users recipes are then stored, not the whole recipe, just the deviation from the base. This the terry system can learn from, either changing the base recipe based on what the collective knowledge prefers, or allowing users to search for general variations. E.g “spicier bolognese” or “Italian Bolonese”.

Basic Recipes would come with tags - “Indian”, “Spicy”, “luxury”; the aforementioned list of ingredients and possibilities; Instructions; and basic information on cooking and preparation time.

User generated recipes would contain a connection to the base recipe; further tags, either replacing or complimenting the base dish; and a list of the changes from the base recipe. Changes are stored, not the full list, as millions upon millions of user full generated recipes would create unfeasible burden on the server, and it is more user friendly to the people preparing meals if they are given options on a base, and not thousands of inseparable opportunities.

BEST BEFORE DATES

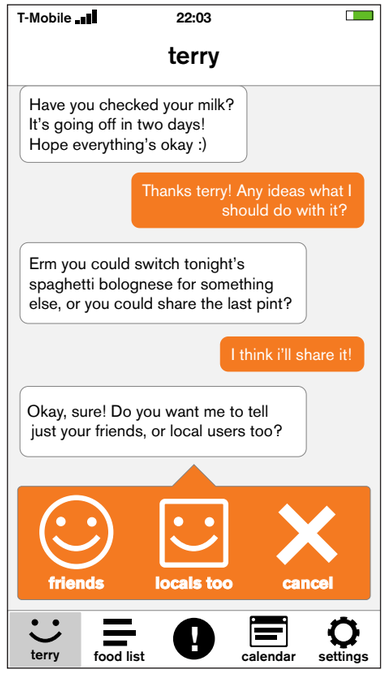
Best before dates are both unreliable and difficult to obtain. Instead of relying on supermarkets for the data, we will crowd source the best before dates. After an initial round of inputting all best before dates, the users will be able to rely on data of averages. These averages will be based on a collection of user judgment, and actual best before dates.

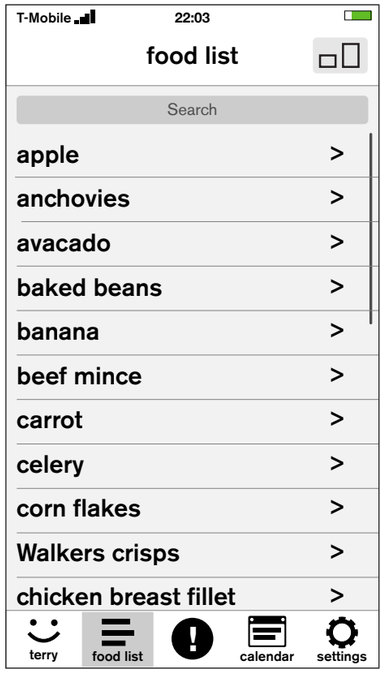
The system will have data on the average claimed best before dates, the average user best before dates, and the standard deviations of these values. They will be stored as basic numbers e.g “6” days from purchase.

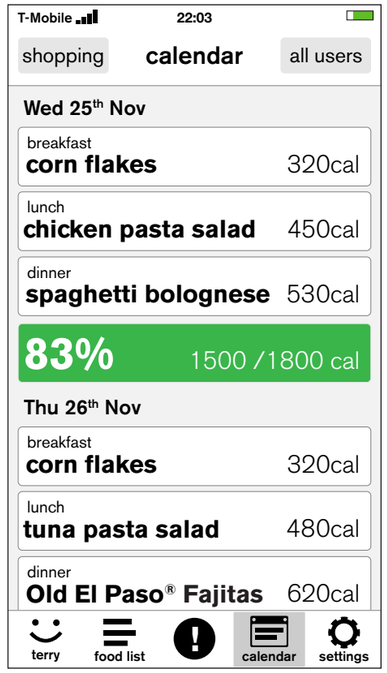
If a user decides to use something after the claimed best before date, then this will be recognized and push the user best before dates higher for this particular item. This, done frequently, would imply that the claimed best before date is systematically too early.

Users would still be allowed to select to use just claimed best before dates, clearing us of legal implications, and terry will can ask users to put in specific best before dates fro high risk and often wasted foods, which will teach users to focus on the problems, and provide continual updates. In general, terry will also tend towards early best before dates in general meal planning and warning.

THE APP







TERRY CHAT

The concept has always been about emotional design, so we have created an entirely new form of interaction design in the terry chat component of the app.

Users select from per-selected responses, and a dialogue is created which is completely new but totally intuitive for anyone familiar with a phone.

The intention of this emotional, personal design is again to get users to care about food waste, and also to really enjoy using the product.

Personal companions like siri, and Microsoft cortana already exist, and terry is much more lightweight in that he only has to select and respond from pre selected message templates.

FOOD LIST

The food list is a mirror of the food list at the home, allowing users to check on their food supplies from out of the house. This aids in allowing for spontaneous meal ideas, and allows users to prevent overbuying, as they may usually find themselves in a shop with no clear picture of what they already have.

It will have the same functionality as the fridge unit too, allowing to ask for meal suggestions and recording food as eaten.

CENTRE

The centre is a news feed which greets users when they first load up the app. Among it's features are:

COMMUNITY COMPETITION
Inspired by apps like QuizUp, the app can rank users and give them rewards based on how much food or money they have saved.

COMMUNITY SHARING
The app enables people to accept food from other people. This really ties in a positive community environment to the product, and would appeal to students, who may only buy the app and not the device, as it allows them to save money.

POPULAR DISHES
There would be huge possibility, with the data we already have, to promote new dishes between our users, this is another USP of our app, which is also in competition with other meal plan apps.

ADVERTISING
The cynical addition we have a lot of data on or users, which *could* be used as a revenue stream.

CALENDAR

The Calendar is another mirror of the calendar on the terry device, but on the app it additionally has functionality for shopping lists and calorie counting.

MEAL PLANS
As the users update the system with their presences and routines, it is easy for us to enable easy meal planning. This can be done with varying levels of automation. For example, it would be possible for a user to specify "fish is on a Friday" and for the planner to do the rest. New meals could also be added from suggestions in the 'centre'

SHOPPING LISTS
As we have users meal plans, and as we learn what they prefer to eat, it is easy for us to generate shopping lists. These can be specified by the user selecting a frequency of shopping trips, and the app doing the rest. There is also the possibility for users to price compare shops week by week, ordering off whichever supermarket is cheapest for their specific list that week.

SETTINGS

USER PROFILES
There will be a combined profile, for using the terry system in the kitchen, but the active, food buying users will have their own app, so they can personalise calorie goals and social settings. Shown on the above image, is "Dave E"s profile, linked to Sues, and the two children who are not buying food, but able to be controlled by Sue.

TERRY @ HOME
To relieve the burden of having to use the minimal interface for complex tasks, such as entering preferences and food use, this can be done on the app also, as an option.

HEALTH
HealthKit is an Apple iOS API which enables the central consolidation of heath data, by tying in with HealthKit on iOS, we can enable users to use the calorie data to further a healthy lifestyle.

DESIGN

MINIMAL COLOR USE
The use of minimal color promotes a positive visual connection between the kitchen device and the app. A colorful app would make the monochrome kitchen device seem poor and cheap, but the restrained app design is powerful, good looking, and provides a logical differentiation device between ours and other apps.

CUTE FACES
Although it seems whimsical at first, the cute faces for user profiles, which it is proposed are editable by changing one of two features such as hats, bows and facial hair, tie into the visual identity of the terry brand. They make terry feel like one of us. The visual identity is transferred over to the other app icons, maintaining line weights etc. To deliver a consistent look and feel.

FAMILIAR INTERACTION
The app combines a simple and understandable layout with features that should be familiar to users of the device. We have used the iOS Human Interface Guidelines, with a little help from the Google Material Design guidelines, to influence our app. It therefore uses standardised tab bars, navigation bars and list displays.

DEVICE INTERFACE

DIGITAL UX

The digital user interface for the kitchen device will be a GUI running over the top of the linux kernel. The device has an e ink display, which means our color pallete is limited to mainly just black and white. The visual language of the device has been influenced by this constraint, as well as the brand image we have developed over the course of the project.

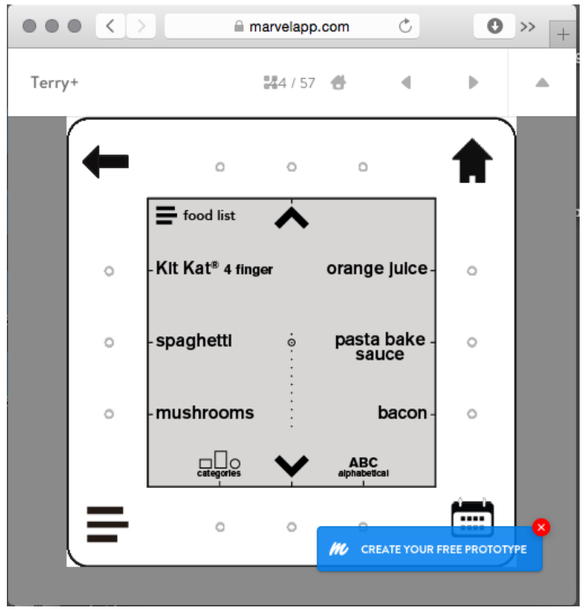
INTERACTION

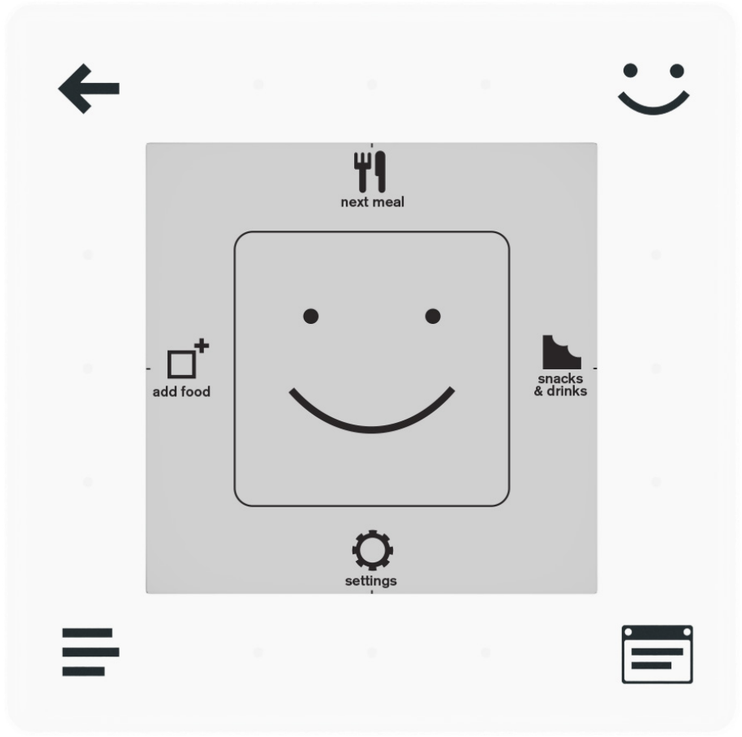
The interaction is performed by pressing upon the bezel, which senses location capacitively, and registers presses as physical clicks, providing feedback to the user.

The four key buttons, back, home, list, and calendar. were chosen to give our users ample room to 'escape' from whatever page they found themselves on, allowing them the freedom to explore, whilst the bottom ones connect them to the two most useful general features.

PROTOTYPING

The device has been digitally prototyped, which gave us a way to appreciate the look and feel of the final product.

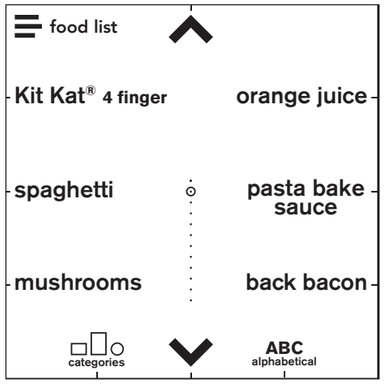




NOTIFICATION

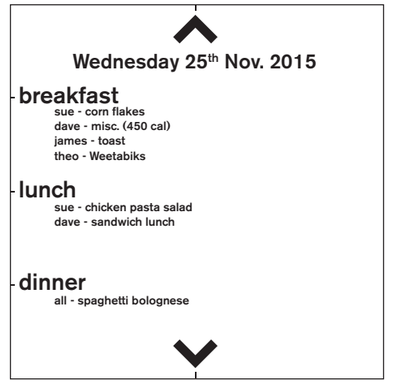
Notifications are handled emotionally, the unhappy face acts as a subtle reminder that things are not quite right. Users are prompted when they nudge the device about the specific problem. They can immediately dismiss this notification, or ask for more helpful advice, including adjusting plans, or sharing with the community.

FOOD LIST



The food list can sort by most used, alphabetically, and by category. It allows users to get suggestions for recipes, and to quickly enter the use of any items.

CALENDAR



The calendar displays the next few days of food usage, where food can be changed, varied, or deleted to make. The recipes are cloud sourced, and multiple users can have selected different foods per meal.

BUSINESS MODEL CANVAS

KEY PARTNERS

Our key partners consist of environmental agencies such as Greener Scotland, who seek the reduction of food waste due to the environmental harm this can cause when it rots and creates greenhouse gases, and when it is transported.

Densipaper is our screen supplier, RS components is our switches and ion batteries provider, Becker motors is our motors supplier, Kingston is our SD card supplier, Aquarius plastics is our ABS supplier, Epson is our scanner supplier and Inventek systems is our wifi module supplier.

KEY RESOURCES

The parts required to build Terry are: Pearl E-Ink 5” Screen, Momentary switch, Capacitive Bezel, Scanner, Roller Motor, 4GB SD Card, ABS Case, Lithium-Ion Battery, Wifi Unit

Web and app development and maintenance is necessary.

Terry is to be intellectually protected as well as the brand. App to be submitted to the App store and Google play for acceptance.

Warehouses are necessary for storage of product before being sold.

COST STRUCTURE

Our business is more cost driven since there will be lots of outsourcing of the different parts of production. Our service will be sold at a competitive price, and it maintains a lean cost structure to deliver profits The most important expenditure for Terry is the maintenance of the app and website since these are the touch point that allow the user to interact with Terry at a more personal level. This consists of the salaries for the team of software engineers that will maintain the system, and for server maintenance.
The most expensive resource is the manufacturing, which should not surpass £20. The device will cost no less than £60. The cost of packaging is around 15% of that of the manufacturing.

KEY ACTIVITIES

Arranging supply and manufacture

Terry will be sold as a commercial off-the-shelf product, with a separate free app, which will require front end development

The interface and operating system for the physical device will need front end development

The system will require extensive database management, back end development, and some community moderation

REVENUE STREAMS

Our customers are willing to pay an average of £70. Currently most of our customers don’t pay anything for this kind of service since it does not exist. There is scope, but no need for subscription based paying.

With our wide database on customer habits and preferences, we offer a unique platform for very well targeted advertising. This could be opened up as a revenue stream, making both our product and our app self-sustaining.

VALUE PROPOSITION

Terry is a new and innovative way to save the customer an average of £470 a year by organising their food supply and use in an unobtrusive and friendly manner. It aims to be a friendly kitchen helper that the user can relate to.
As a consequence of this the user helps reduce global food waste, associated with at least 20 million tonnes of greenhouse gas emissions, therefore reducing global warming.

By using reminders and planning meals ahead of time, Terry helps the customer use all their available food efficiently before they it goes out of date. If the user chooses not to use their food for any reason, they have the option of sharing said food with friends or other nearby users through Terry.

Terry consists of an app, a website and a device to be attached to any of the customers kitchen appliances, ideally the fridge.
The app is a free download from the app store/ Google play, but only includes the calorie counter and the meal planning features.
The website has the same features as the app before purchase of the device, which unlocks the rest of the features on both platforms. The device shows its emotional state on the screen indicating that an item may be going out of date.

The app and website allow the user to use or edit any recipe. Recipes will be suggested by Terry according to the food the user has.

CUSTOMER RELATIONS

The app provides a touch point between the user and the system, which can be interacted with in a personal way as if Terry were the users friend. Through the app and website the user will be let know of updates and new features added to Terry.

Customer service help will be provided through the website for cases in which customers encounter issues with Terry which need to be solved.

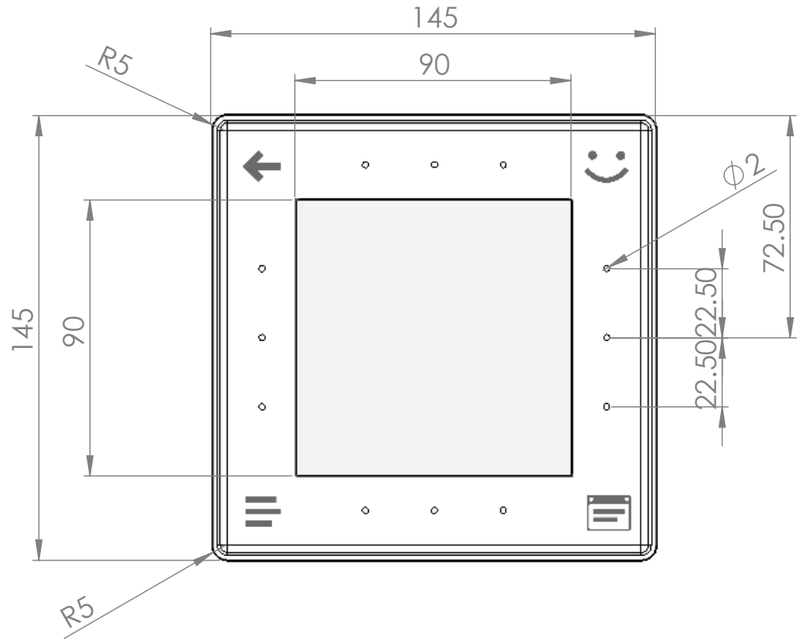
CHANNELS

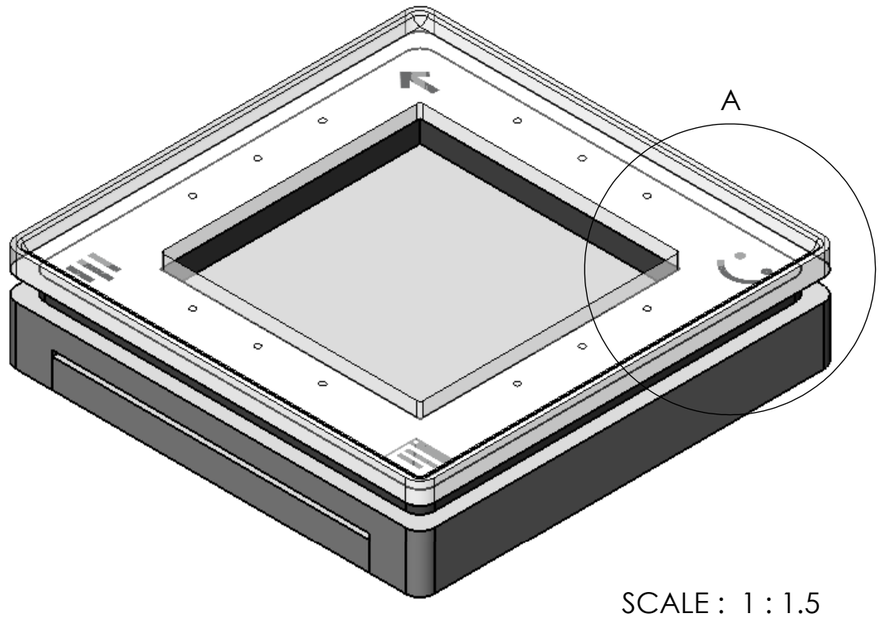
Advertising digitally, in print, and on TV, and organisations such as Greener Scotland will help raise awareness about Terry.
The customer can purchase the device from stores such as Argos or John Lewis, or on-line, and the app is available for download for free on the app store or Google play.
Protection of the environment while also saving money is the key selling point for the customer.
One year warranty is provided with purchase of the product.

CUSTOMER SEGMENTS

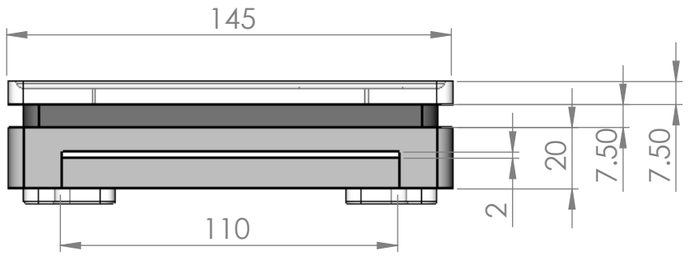
Terry is aimed at everyone and anyone.

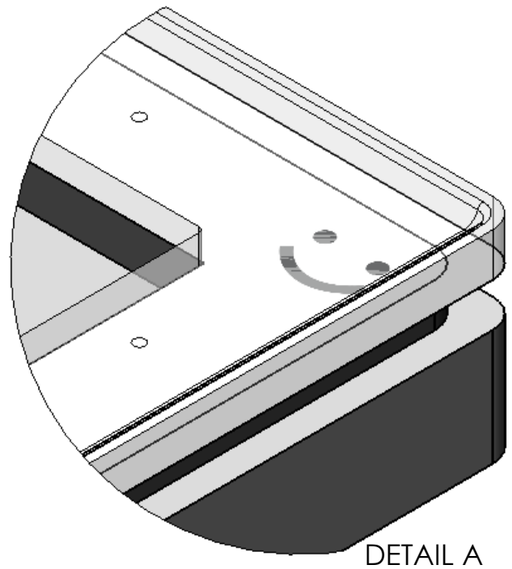
In order to make Terry accessible to all user bases, the app and the device work independently from each other but work best when used together.
The app is free allowing users such as students to access some of the features of Terry without having to spend any money, but they are encouraged to purchase the device in order to unlock the full potential of the product.
The device does not require the app or Internet access to function, allowing old age pensioners to use it without the need for technological skill or resources. This is done by storing the necessary recipes and use-by dates in the device and having the notifications and reminders be present on the device screen.
When the app and the device are used in conjunction Terry offers a wide range of features suitable for both busy parents and young professionals.



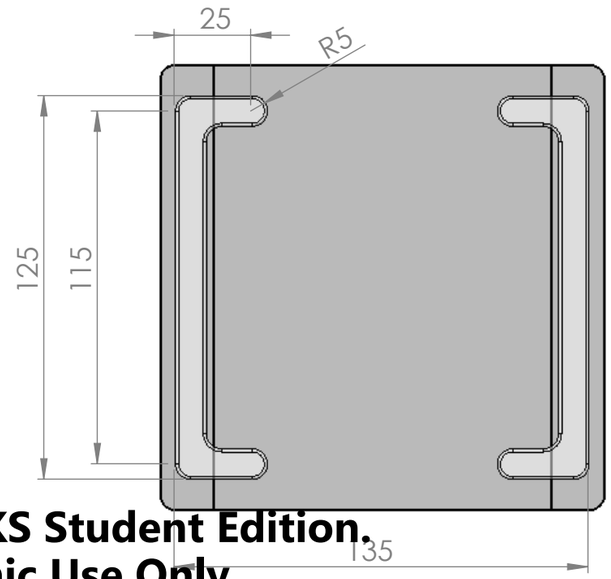


SCALE : 1 : 1.5





DETAIL A
SCALE 2 : 1.5



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TERRY GA DRAWING	MATERIAL : VARIOUS	NAME : HOTDOG	A3
ALL DIMENSIONS IN mm	SCALE : 1:2	WEIGHT : 535g	SHEET 1 OF 1