

## **Nest Assured**

RFID, ESP-NOW

# **Google's First** Item Tracker.

Never forget your things ever again.

Find out more



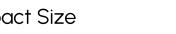
'Google / Google Nest were not engaged in any consultancy or collaborative capacity with this project and the outcome is in no way endorsed by them. Any publicity is limited to personal and academic use'.



# Nest Assured, Rest Assured

Wireless Communication Compact Size

Easy Integration 



Builds Habits

A plug-and-play tracking solution that integrates seamlessly into dynamic and fast-paced lifestyles. Using RFID and wireless long-range protocol ESPNOW technology, it is compatible with all devices and items.

Designed for young adults with ADHD, but useful to anyone. Nest Assured helps users break free from the endless cycle of over-planning and forgetting.

It is not just another app destined to be lost among others in your phone. It is not another product that demands six other devices from the same brand to function properly.



### Product Opportunity Statement



## **Secondary Research**

ADHD is a persistent pattern of inattention and/or hyperactivityimpulsivity that interferes with human functioning or development.



Of adults in the UK have ADHD, equivalent to 1,574,129 people

It is more prevalent in males than females, with a ratio of 3:1

There are three sub-types of ADHD: Hyperactive-Impusive, Inattentive and Combined. A majority of individuals diagnosed with ADHD fall into the last category.



Hyperactive-Impulsive (ADHD-PH) Inattentive (ADHD-PI) Combined (ADHD-C)

## **User Research**

ADHD varies between individuals and the symptoms can manifest in a myriad of ways. Interviews allow the individuals to comfortably fully express their thoughts, opinions and feelings. On the same grounds, surveys were not conducted. The reasons for interviews are to

 $\bigcirc$ 

Allow for variability in responses

Δ



- Enable ease of discussing personal struggles and experiences
- Allow users to delve into personal experiences comfortably

## **Selection Rationale**

Based on the background research and interviews, a divergent methodology was adopted and 4 initial ideas were ideated.







Pill Dispenser	Bottle	Bag Scar	nner	Smart Brac
Pill Dispenser Bottle				with compart ecified time fo
Bag Scanner		1		ising RFID for ite lights to preve
Smart Bracelet		0		vels with a ng well-being t
Task Bracelet				nifying task con et, and comple

# **User Feedback & Analysis**

The various ideas were analysed against both guantitative and gualitative metrics, and found that Bag Scanner had the greatest development potential. An analysis of market leaders was performed, focusing on the design, functionality, and the gaps. This helped inform the development of the Bag Scanner. The final product will consist of 2 main components.

UHF RFID Scanner	Controlle
RFID allows cross-functionality	Serves as
Left at bottom of the bag	Controls s

### Research Methods & Selection Rationale





### celet Task Bracelet

tments for medication storage. Each or medication intake.

tem scanning during packing. Provides ent forgetting essential items.

timer for emotional awareness. trends over time.

mpletion with friends. Tasks are linked eting them collectively earns rewards.

### er

s main user interface

selection, viewing, scanning



## Elegance, durability, and environmental responsibility

Google's home products balance **aesthetics**, **functionality**, **and sustainability**.

Using high-quality metals, premium plastics, and sustainably sourced fabrics, the products are **sleek**, **robust**, **and long-lasting**.

Metals provide a polished, sophisticated look while ensuring sturdiness and longevity. The smooth, cool touch of metal enhances the tactile experience, adding to the premium feel.

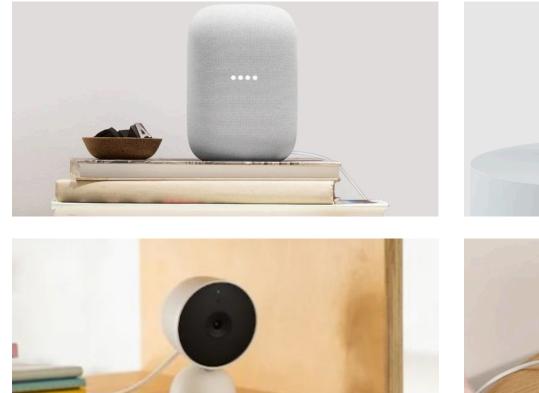
Premium plastics are chosen for their versatility and ergonomic design potential, often treated for a soft-touch feel to enhance comfort and grip.

Sustainability is a core consideration, with Google incorporating recycled materials like plastics and metals, as well as sustainably sourced fabrics. This commitment ensures materials are safe, environmentally friendly, and contribute to a circular economy.

Comparisons to Google's Smart Home products gave insights on their design, features and general aesthetics.

Experiencing their designs firsthand gave us a clear understanding of the finishes we needed to achieve.





### Concept Development







# Concept Development

Nest Assured's design is inspired by and rooted in Google's strive create a home that looks after the people inside it.

### Compact size

Keeping the size of the device minimal was a key focus. Reducing any wasted space while achieving functional integration between components required careful planning.

### Tactile and comfortable

It is crucial for the dial to have unmatched ergonomics and interactions. Initial prototypes made from cardboard and tape developed into 3D printed samples to test size and shape

### Aesthetic integration

Although the two parts will be placed in different parts of the bag, keeping the lines, shapes, colors and textures the same really makes them stand out as integrated devices.

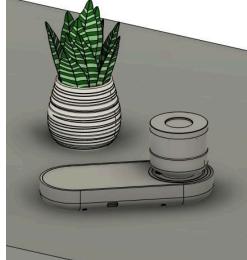
### User testing

By interviewing the 6 users contacted in the previous user phase and conducting collaboration sessions, Nest Assured physical and digital design was validated.

















### Prototyping Plan



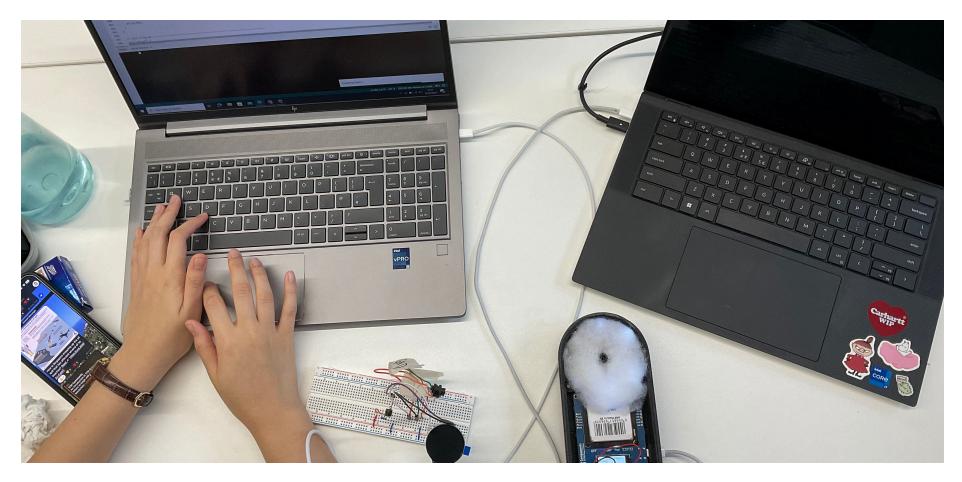
## **Physical Hurdles**

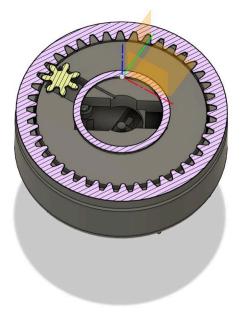
Google's Nest products are designed to be portable and unobstrusive, ensuring they fit seamlessly into various living environments. Multiple CAD iterations were developed to compactly integrate the internal components into an even smaller form.

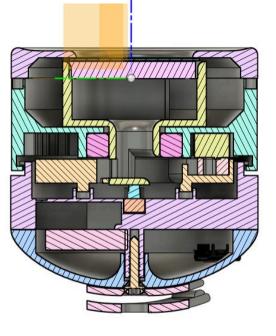
One of the key issues we faced with designing the device was maintaining the bottom and screen stationary, whilst allowing the top dial to rotate. An internal, hollow, stationary shaft was designed to connect the bottom casing and the screen,

Another critical challenge was allowing space for all of the electrical connections. The most charging wire in particular which runs from the screen to the bottom of the dial was the most intrusive as it uses a much thicker cable than the other electronics.

The section analysis tool was useful to see the inner workings.



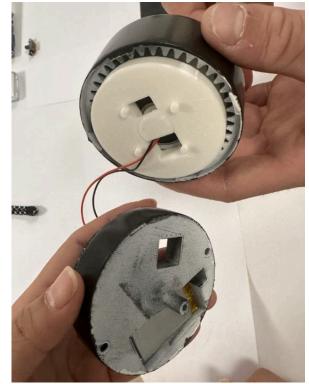






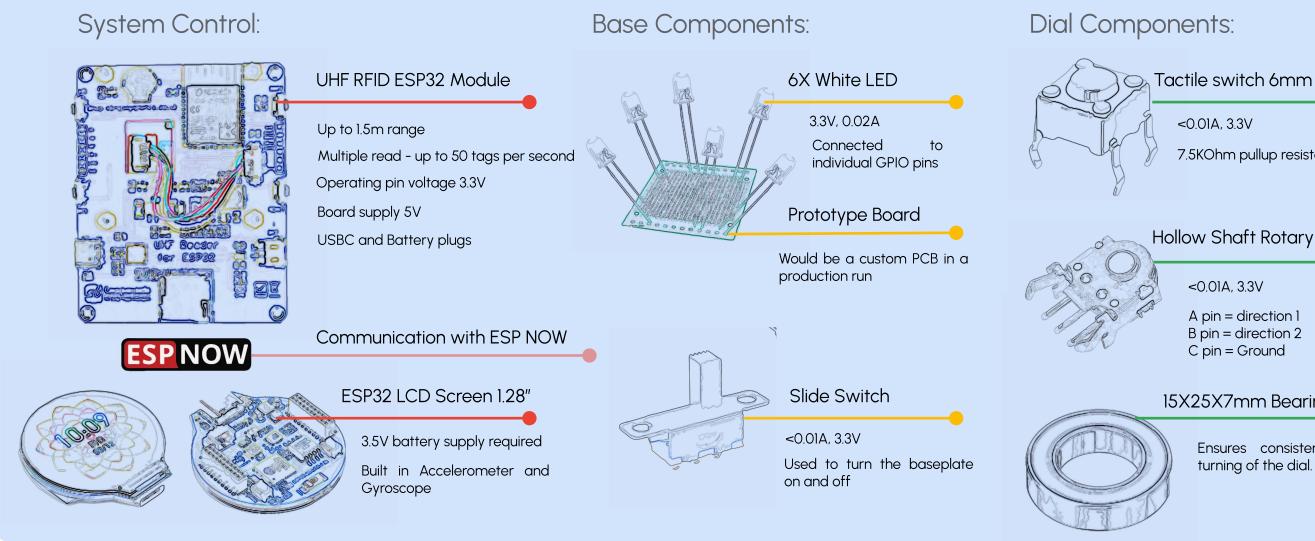


### Integration

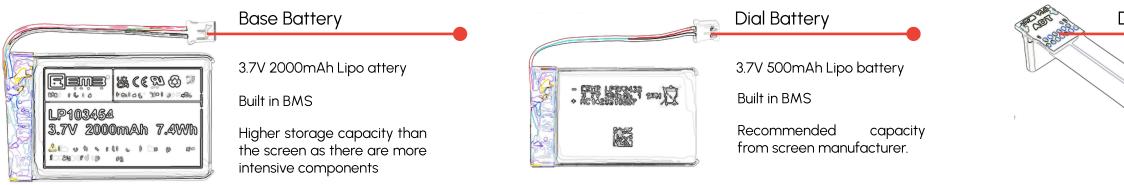




### **Standardised Components:**



### **Power Management:**



# Estimated recharge interval:

Once a week

### Power, Component and Load Specifications

7.5KOhm pullup resistors

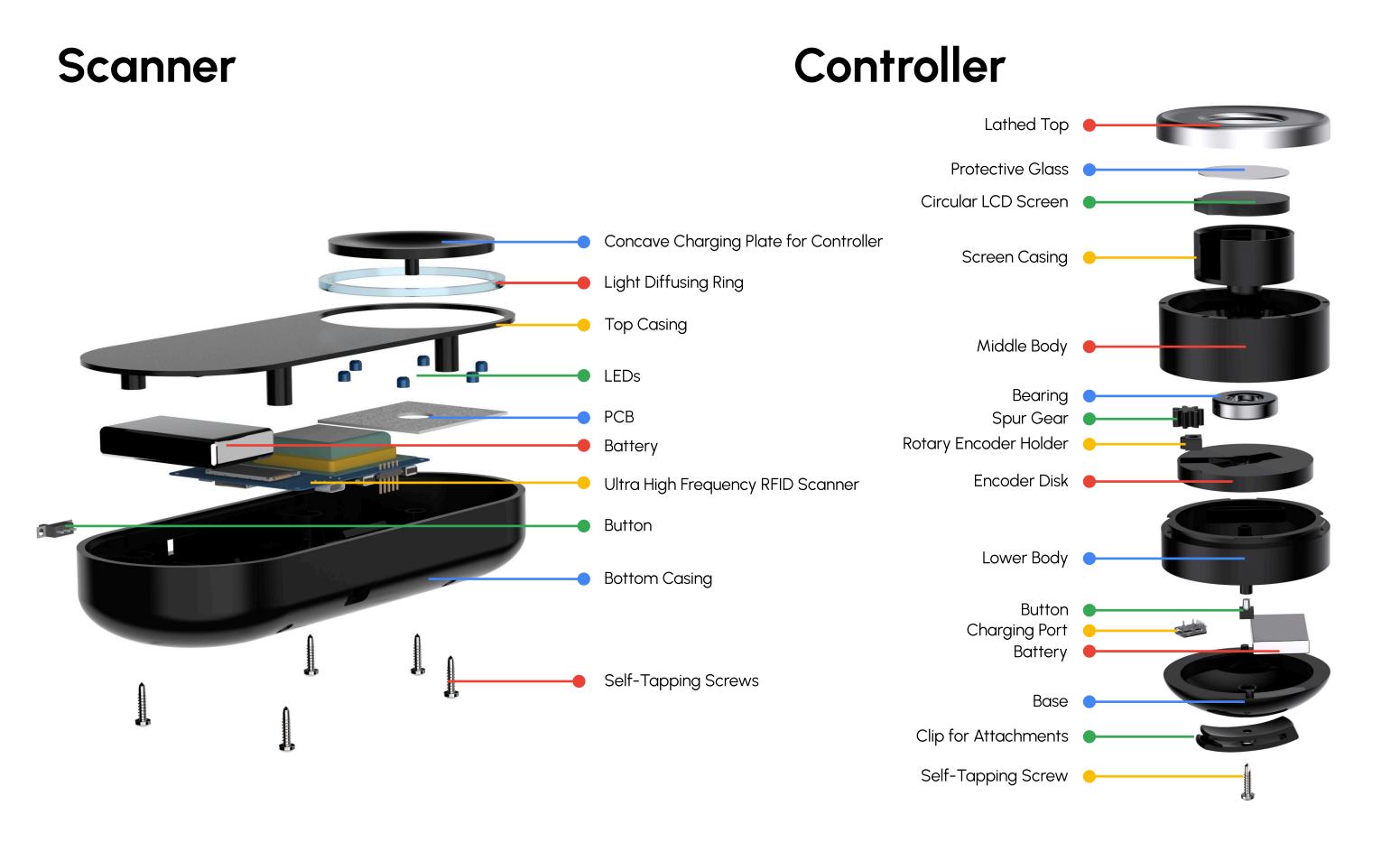
### Hollow Shaft Rotary Encoder

### 15X25X7mm Bearing

Ensures consistent smooth

# **Dial Charging system** USBC 90Degree male, to female port.





## Exploded View



## **Ergonomic Concave Dial**

Lathed with aluminium, the smooth round dial provides tactile comfort, functional precision and premium feel, instigating further interaction with the device.

By incorporating ribs, grooves, and raised edges within the product, the material remains hidden from sight. This seamless design merges the components into a single, unified product.

## Tactile feedback

The effortless adjustment mechanism offers immediate feedback, creating a harmonious and streamlined interaction.

## **Ergonomic Comfort**

The smooth, curved surface ensures a comfortable hold, offering a natural grip and reducing pressure points for the user.

## **Multi-functional attachment**

The interchangeable, customizable attachment enhances the design, offering a secure and visible method for transporting the product while on the move.

### Detailed Design

## Seamless



## **Clear Glass**

The luminescent ring serves as a clear visual indicator of where to position the product, providing an sophisticated look and an aesthetic sensory integration.

### **Polished Aluminium**

The metal bezel elegantly frames the screen, enhancing the picture with a seamless extension. Its cool-to-touch surface and sleek, contemporary appearance add sophistication and convey a premium feel. This aligns perfectly with Google's commitment to quality and durability.

### **Premium Plastic**

The premium material ensures a durable, impact resistant, consistent look across the product, providing a lightweight and comfortable experience

## **Glossy Coating**

The black coating provides an extra layer of protection and a smooth, shiny finish which enhances the quality of the product and grounds the product in Google's Smart Home line-up.

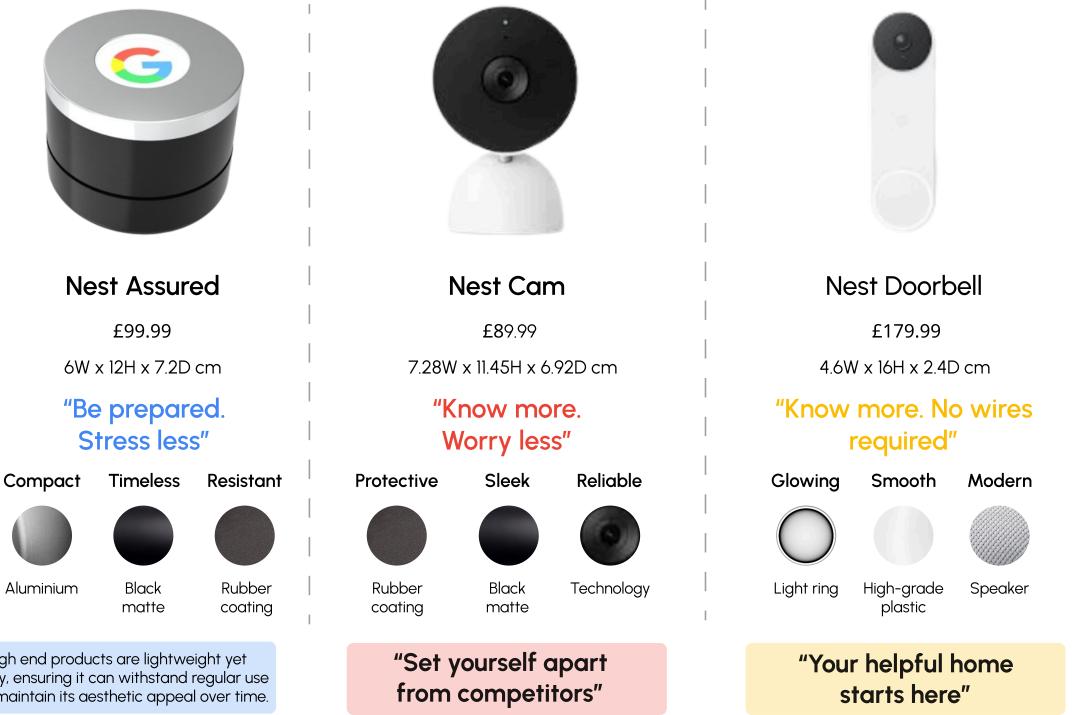
### Colour Material & Finishes





## Enhancing everyday life

'At Google Nest, our mission is to create a home that takes care of the people inside it and the world around it. For us, the home of the future is not a smart home, it's a helpful one.'



High end products are lightweight yet sturdy, ensuring it can withstand regular use and maintain its aesthetic appeal over time.

### Brand Analysis



### Nest Thermostat

£219

4.2W x 4.2H x 3.08D cm

### "It's easy to save energy"



Crisp

Sturdy



Bezel

Glass

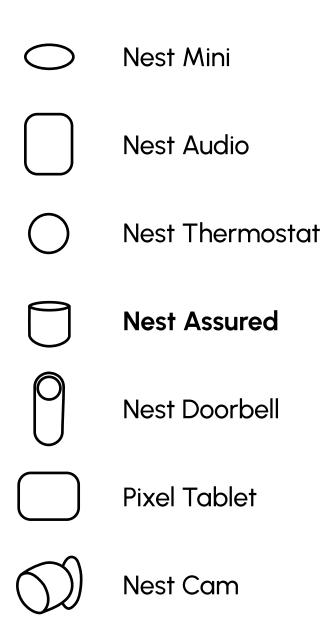
High-grade plastic

Home products are generally small, portable and compact



## **Google Environment**

After rendering our final product we integrated it into the environment alongside other Google product ranges.





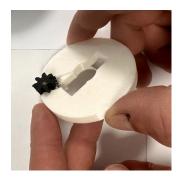
### Branding Considerations



## Controller



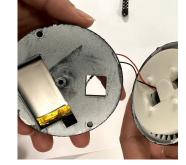
Press bearing into middle body



Place rotary encoder onto holder



Attach button to underside of lower body



Attach battery and feed cable through



Attach base



Screw clip-on onto base

## Scanner



Push charging plate through ring



Place both parts through the top cover

Lay UHF RFID Reader and push PCB into snap fits



Attach battery and connect



Feed power button through cut-out slot



Add cotton gauze for light diffusion



## Total assembly time: 14 mins 29 seconds





### **Assembly Process**



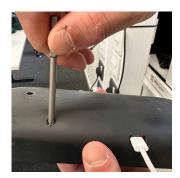
Attach screen to the holder



Attach lathed top



Place lid



Screw close the case

# Total assembly cost:



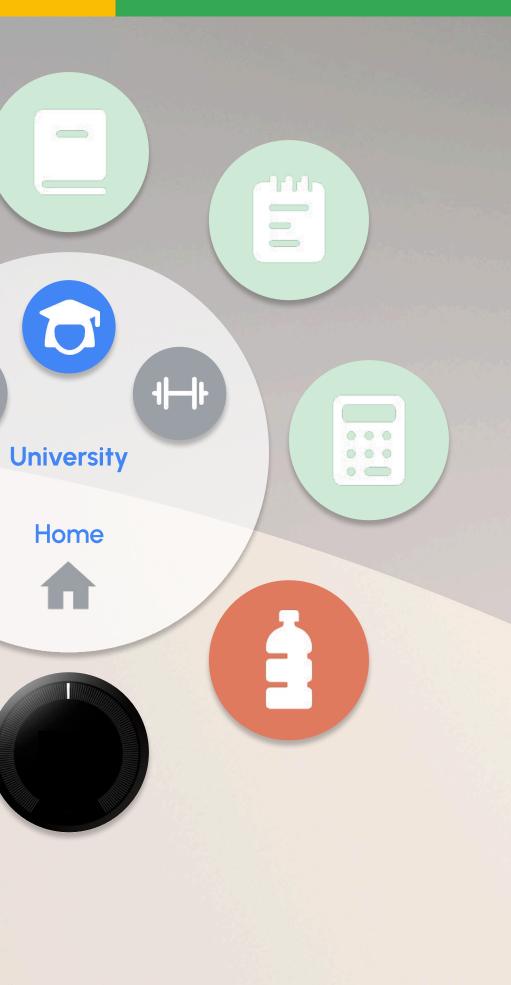
### Intuitive

The UI is designed to be simple and clean, minimizing distractions for users. Icons are used instead of text, making the interface clearer, especially for young people with ADHD who can be easily overwhelmed.

### **Effortless**

The key design feature of the UI and dial is its one-hand operability, allowing navigation through just two interactions: rotating and pressing the dial.

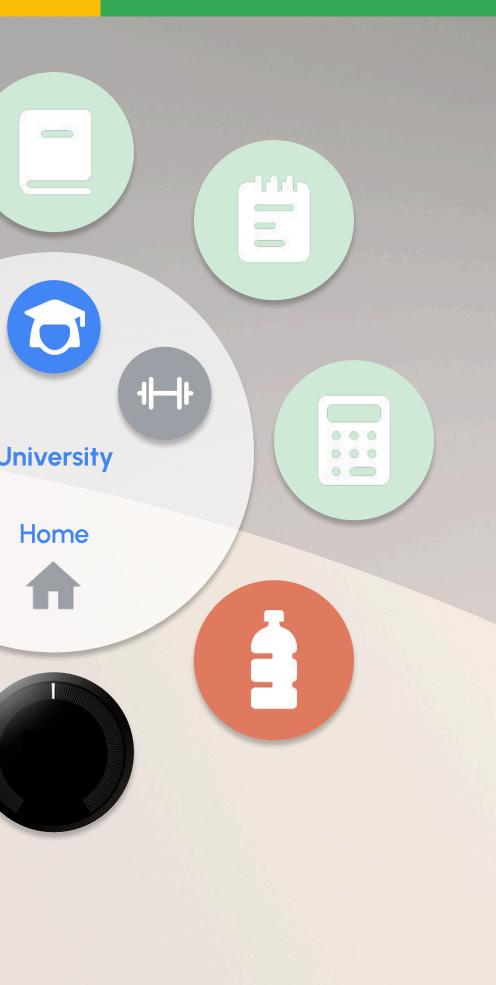
University



G

Home

Scan

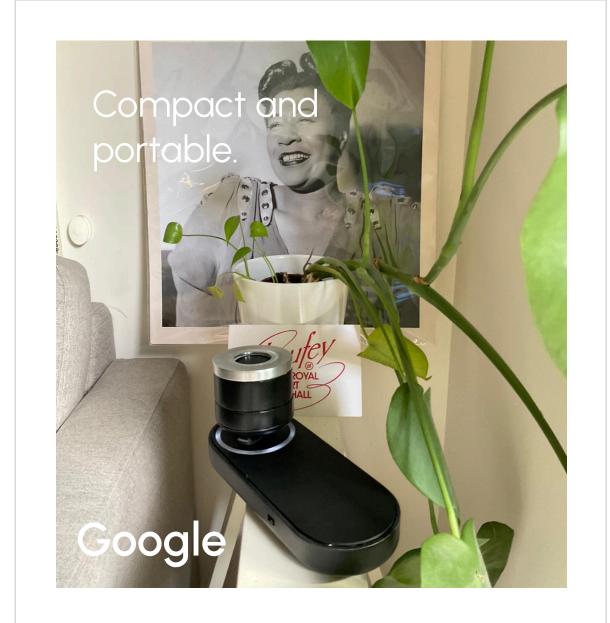


### User Interface



### **Packaging Compliance**

Relevant standards added to the packing



Actual product color may vary from the image

Imported into the EU by Google Commerce Limited 70 Sir John Rogerson Quay, Dublin 2, Ireland Designed by Google. Made in Thailand.





### CAUTION!

Do not expose Nest Assured to liquids.

It can cause damage to the electronic components

Electrical Shock Hazard Symbol warns users of the risk of electric shock if the '4` product is mishandled or if protective measures are not followed.

Exclamation point within an equilateral triangle alerts users to the presence of important operating maintenance (servicing) instructions in the manual accompanying the product.

The product can be turned off completely by switching button off. Mains socket must always be accessible and unobstructed to charge

### Safety Guide

### **HEALTH AND SAFETY**

- Read these instructions
- Keep these instructions Heed all warnings
- Follow all instructions
- Do not expose device to liquids
- Do not disassemble, crop, band, burn, crush or puncture device
- Do not use device if screen is cracked or broken
- If it gets wet, do not attempt to dry it using an external heat source
- Do not use device in the bathroom

Electrical and electronic equipment, ports and batteries marked with the WEEE symbol must be collected and disposed of separately to protect the environment. Google retailer will advise you of the correct disposal method in your country.

### Additional Support

### Care And Cleaning

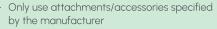
Nest Assured

Additional information at: g.co/nestassured/support

### • Unplug device and adaptor before

- cleaning • Unplug device during lightning storms
- · Unplug device when unused for long periods of time
- Use clean soft, dry cloth to clean device
- Don't use any chemical detergent, powder or other chemical agents (such as alcohol or benzene) to clean device

### **Product Labeling**



- Refer all servicing to qualified personnel. Servicing is required when the device has been damaged in any way, such as powersupply cor or screen is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to the rain or moisture, does not operate normally or has been dropped.
- WARNING: To reduce risk of fire or electric shock, do not expose device to rain or moisture. Do not expose this equipment to dripping or splashing and ensure objects filled with liquids, such as water bottles, are correctly sealed.

### **IMPORTANT!**

- Do not expose device to direct sunlight.
- Make sure device is set up, placed and connected in accordance with the instructions.
- Do not place heavy items on top of your product.
- Do not subject the product to high humidity, rain or sources of heat.
- The product is designed for indoor use in dry environments only. Use within a temperature range of 0-25°C

### **Product Labelling**

MODEL N0776ST. ASSEMBLED IN THAILAND.

Google 70 Sir John Rogerson Quay, Dublin 2, Ireland



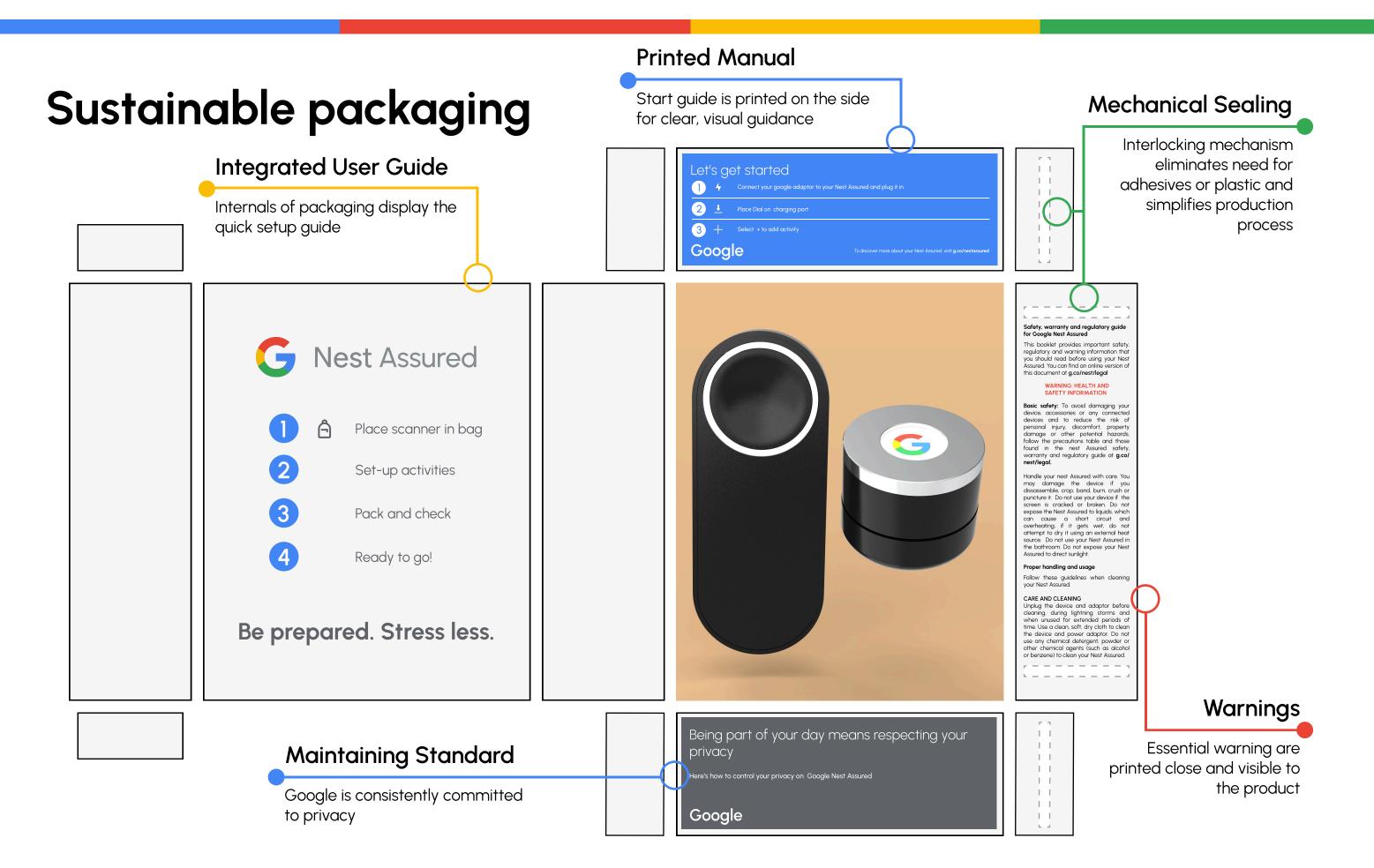


### **Detailed User Guide** Online user guide offers detailed troubleshooting information and can **Eco-friendly** be accessed using the URL code provided on the packaging While Google's standard packaging reflects the company's broader commitment to environmental responsibility, challenges remain in achieving full sustainability due to supply chain complexities, the use of mixed materials, and the need for Beginner's guide to the Nest Assured scanner E better recycling information. F F E Do Nest Assured Being part of your day means respect Vacy et's aet started 1 **Included Manual** 2 3 Manual provides quick start guide Google and safety guidelines

### User Guides & Insights







### Product Packaging & Design



RFID Scanner Control from a

# Ideal Packaging



Be prepared. Stress less.



### Product Packaging



## Google's First Item Tracker.

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# Be prepared. Stress less.

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Milestones	May 2024					
Idea Validation			WED	THU	FRI	
Testing and Quality Assurance				2	3	
Electronic Component Coding				-	C C	
Functioning Final Prototype						
	MON	TUE	WED	THU	FRI	
	6	7	8	9	10	
			Deciding on Product			Cor
		Collection of Survey F	Results	leating		
Updates & Revisions	MON 13	TUE 14	WED 15	THU 16	FRI 17	
CAD Iterations	Initial Cleatabing					
Shape Feedback and Validation	Initial Sketching	Final Decision		rototyping Lo-Fi ser Feadback and Va	lidation	
Coding Screen	MON		WED		FRI	
UX/UI Design of Screen	20	TUE 21	22	THU 23	24	
			Choosing Brand and Ident	titv		
	Ordering Components		Electronic Planning		Report and Portfoli	o T <u>emplo</u>
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<b>.</b>	June 2024					
ESP32 Communication	June 2024					
ESP32 Communication Mechanical Interaction	June 2024	TUE	WED	THU	FRI	
ESP32 Communication Mechanical Interaction Product Tolerances		TUE 28	WED 29	THU 30	FRI 31	
ESP32 Communication Mechanical Interaction Product Tolerances Environment Rendering	MON					
ESP32 Communication Mechanical Interaction Product Tolerances Environment Rendering Video Recording	MON 27 CAD Work Report Writing	28	29	30 nal Component Orde	31 ring	Prot
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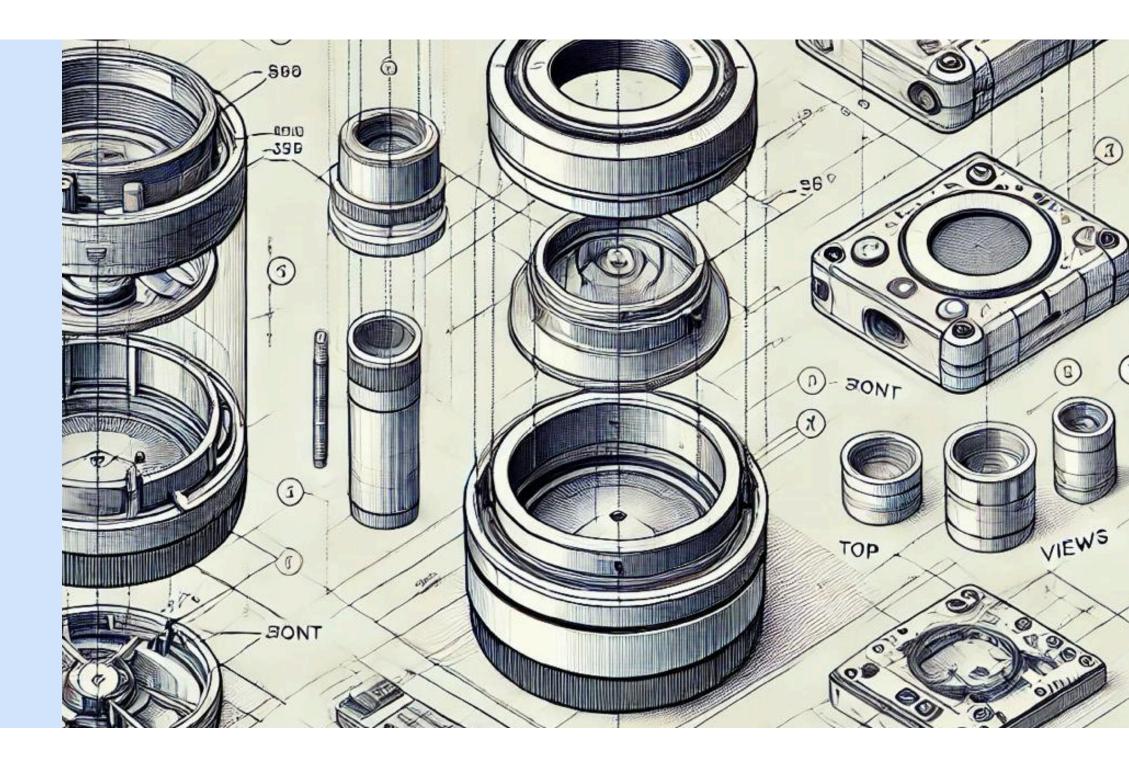
## **Nest Assured**

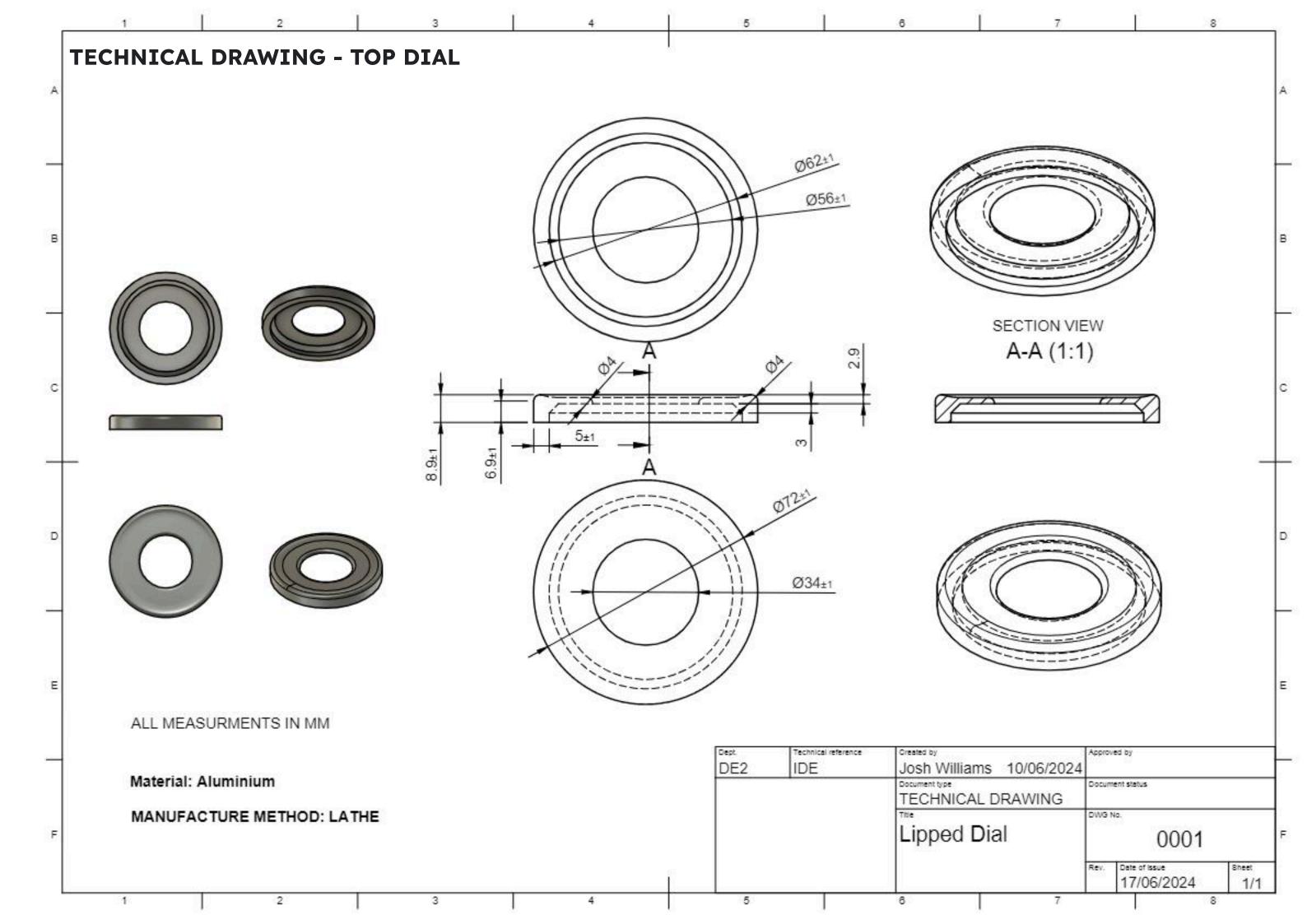
RFID, ESP NOW, Mechanical Interaction

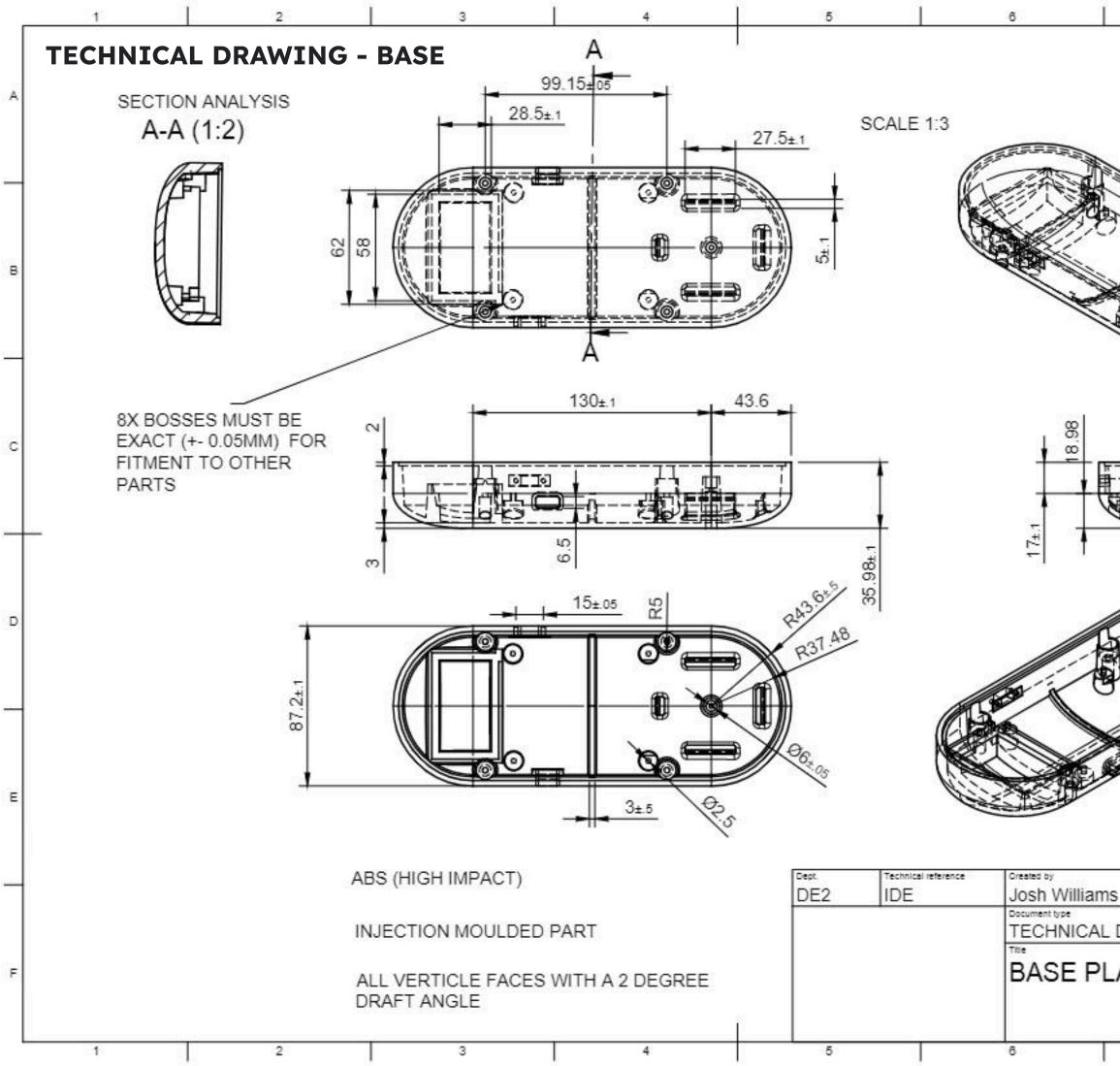
# Production Data Package

Dive inside the Nest Assured

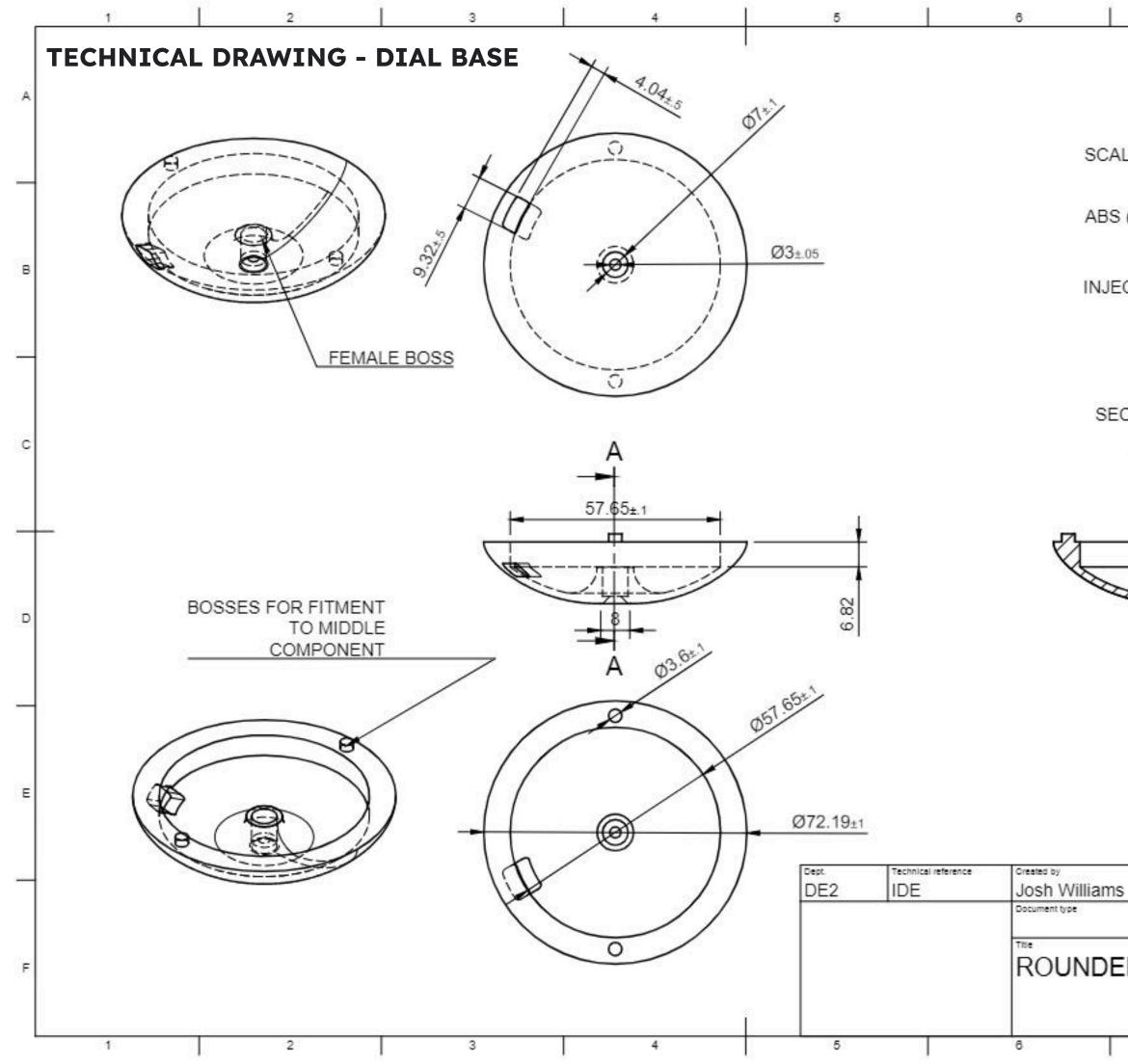
Find out more  $\longrightarrow$ 



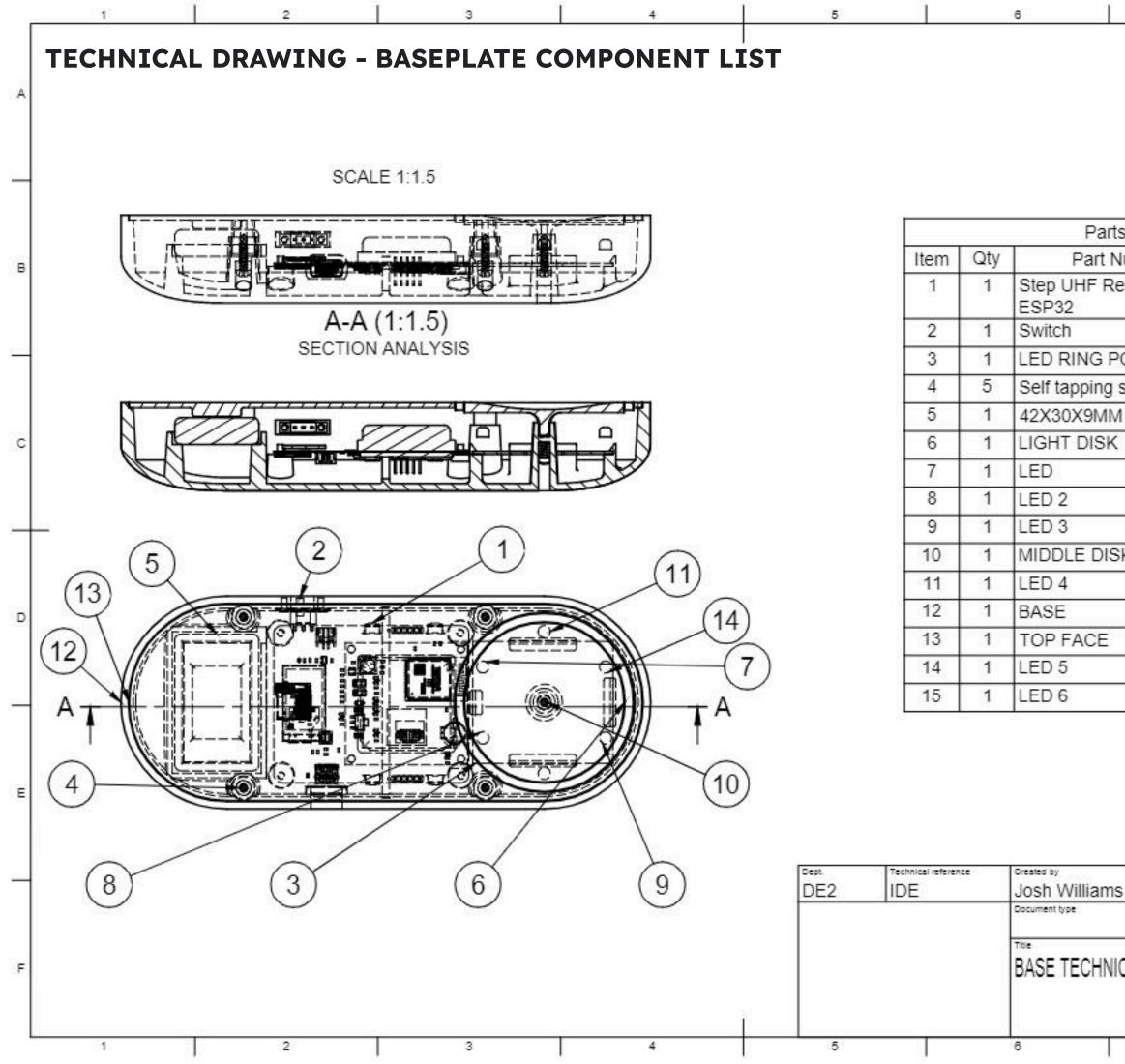




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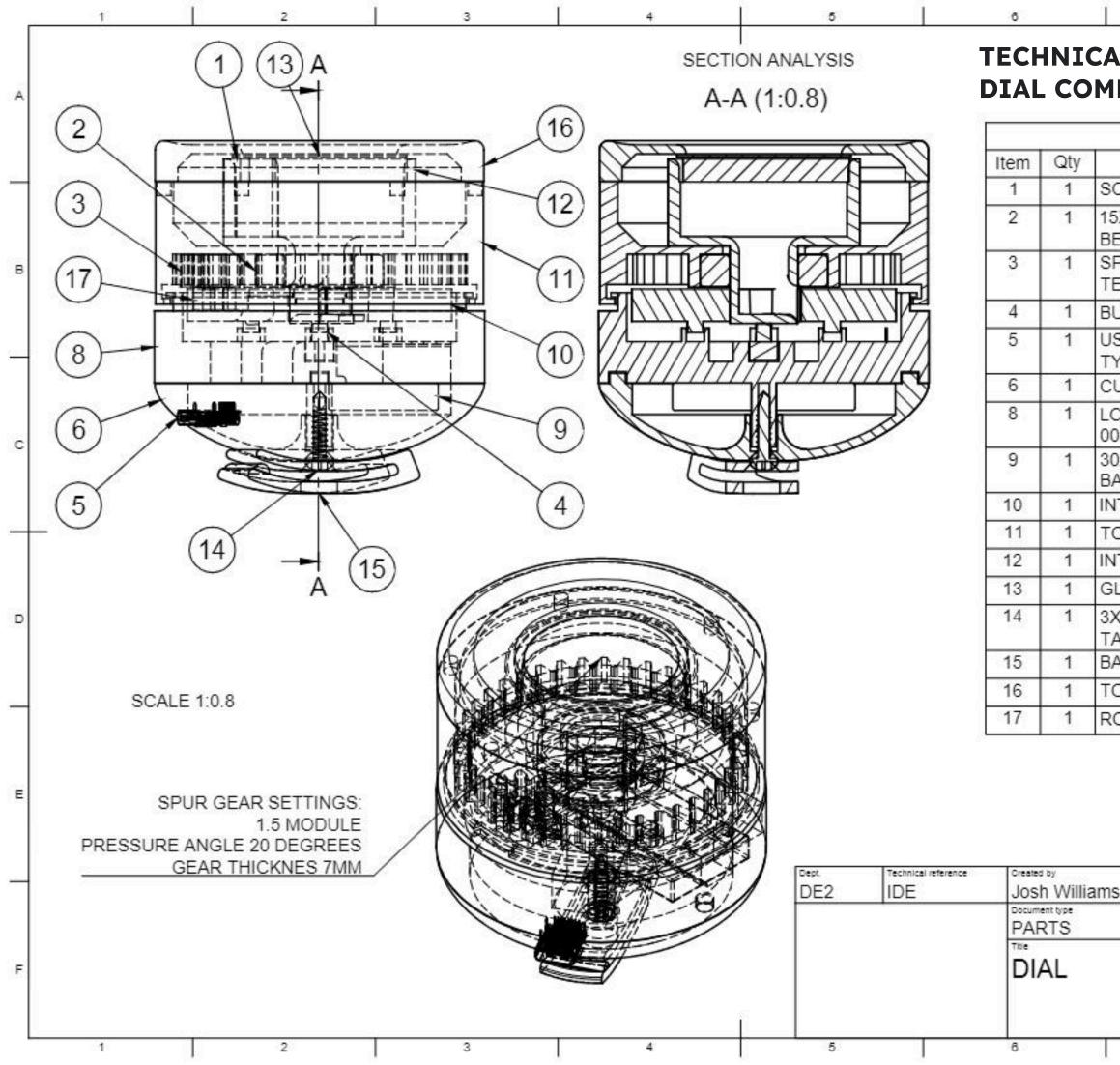
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### TECHNICAL DRAWING -DIAL COMPONENT LIST

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		Parts List
	Material	Part Number
	STD.	CREEN
	STD.	5X22X7MM EARING
в	ĀBS	PUR GEER (7 EETH)
	STD.	UTTON
-	STD.	SB CONNECTOR YPE C FEMALE v1
	ABS	URVED BASE 005
c	ABS	OWER EXTERNAL 04
ľ	STD.	0X22X6MM ATTERY
	ABS	NTERNAL DISK 003
-	ABS	OP EXTERNAL 002
	ABS	NTERNAL CONE 001
	STD.	LASS COVER
D	STD.	X15MM SELF APPING SCREW
	ABS	AG CLIP
	ALUMINUM	OP DIAL
	STD.	OTARY ENCODER

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# **Casing Design**

Consistent 3mm casing thickness

Snap Fittings for LED PCD board

Ribs for stiffness

Bosses for lid attachment

2 Degree Draft angle

### Technical specifications

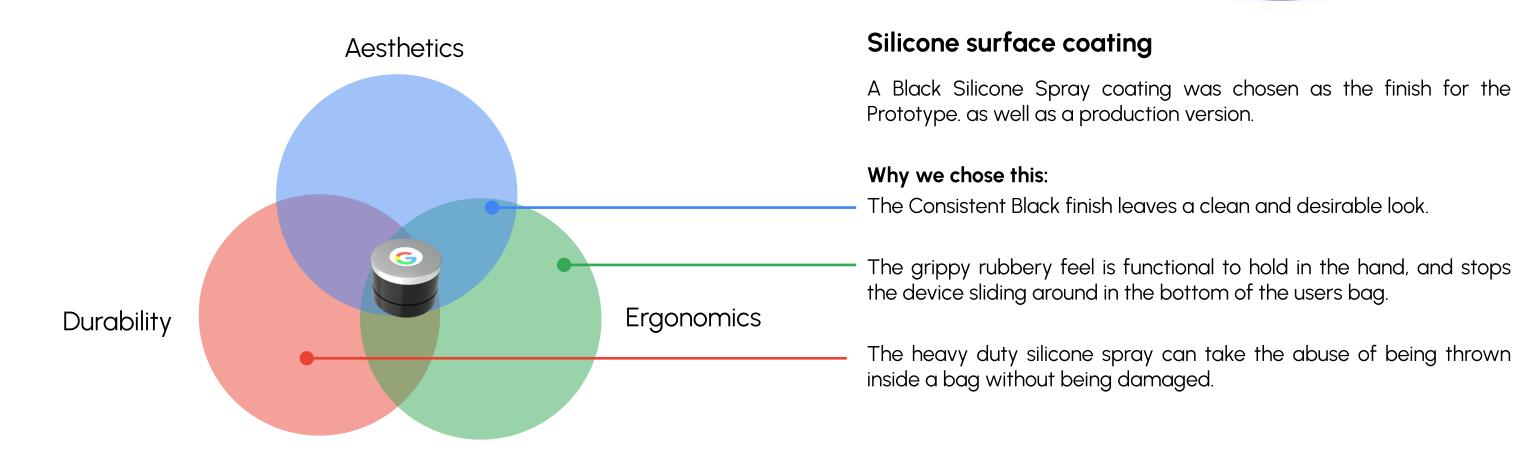




## **CMF** specification

## Different looks to suit your style

Nest Assured will be available in a variety of colors, in line with the google brand.



### Colors, Materials, Finishes





## References

Slide 3, Facts about ADHD:

NICE UK, Attention deficit hyperactivity disorder: How common is it?, Last revised in April 2024, Available at: https://cks.nice.org.uk/ topics/attention-deficit-hyperactivity-disorder/background-information/prevalence/ #:~:text=In%20the%20UK%2C%20the%20prevalence,and%20in%20people%20with%20disabilities.

Slide 6 and 11, Images of Nest products:

Google Store, Your helpful Home starts here. Available at: https://store.google.com/gb/category/connected\_home?pli=1&hl=en-GB

Slide 11, Google nest mission:

Nest partners, FAQ's. Available at:: https://nestpartners.withgoogle.com/faqs/ #:~:text=At%20Google%20Nest%2C%20our%20mission,knows%20what%20your%20customers%20like.

# Video



The video has been carefully crafted using further inspiration from Google Nest branded adverts and infographics.

Key highlights are using light, modern environments which portray the home in a functional light.

You can find the video here:

### https://www.youtube.com/watch?v=iS23X2kF1yc

### References

## **PRODUCT TEARDOWN**

