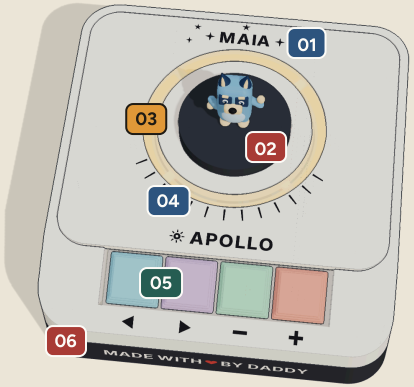
Orbit

Made for Maia and Apollo: stories, tactile keys, and electronics from the ground up.



Two views around a screenless friend

Warm chalky white above, ribbed charcoal below, with Maia's stars, Apollo's sunbeams, four quiet keys, and every port neatly recessed in the back.





01 **MAIA 7 Stars** Pleiades inlay on top plate	02 **Magnetic Puck** Self-aligning dock cradle	03 **24-LED Halo Ring** Captive warm resin lens
04 **APOLLO Sun & Rays** 13 sunburst hour ticks	05 **4× Quiet Keys** Pastel silicone-damped row	06 **Made With Love** Crimson heart front script
07 **Power Push Button** 1.5 s latch + amber ring	08 **Shielded USB-C** Recessed 5 V panel jack	09 **Status LED Lens** Red charge / Green full
10 **Mode Slide Switch** Story SD card or Room cast	11 **Wrist Strap Tunnel** Corner drop-safe bar	12 **mazmandoo Mark** Fluted grip + side script

A growing shelf of buddies

Orbit isn't tied to a fixed starter set. Any toy you bring home (Bluey today, Disney pals, K-pop Demon Hunters, or dinosaurs next year) glues cleanly to a fresh charcoal puck.





Collectible Gel-bonded top toy	**Ø 40 mm** Flat matte puck lid	**NTAG215** Ø 25 mm song tag	**Ø 12×1 mm** Steel disc + N52 core

Eighteen parts, one stack

Hidden base screws; every piece stacks straight down.

01 **08: Flat Puck Lid**
Ø40 mm, 2.3 mm roof

02 **Ø25 mm NTAG215**
Ø30.4 mm collar cavity

03 **01: Top Deck Plate**
Maia, Apollo & hatch lines

04 **4× Quiet Keys + XDA**
20.0° ergonomic slope

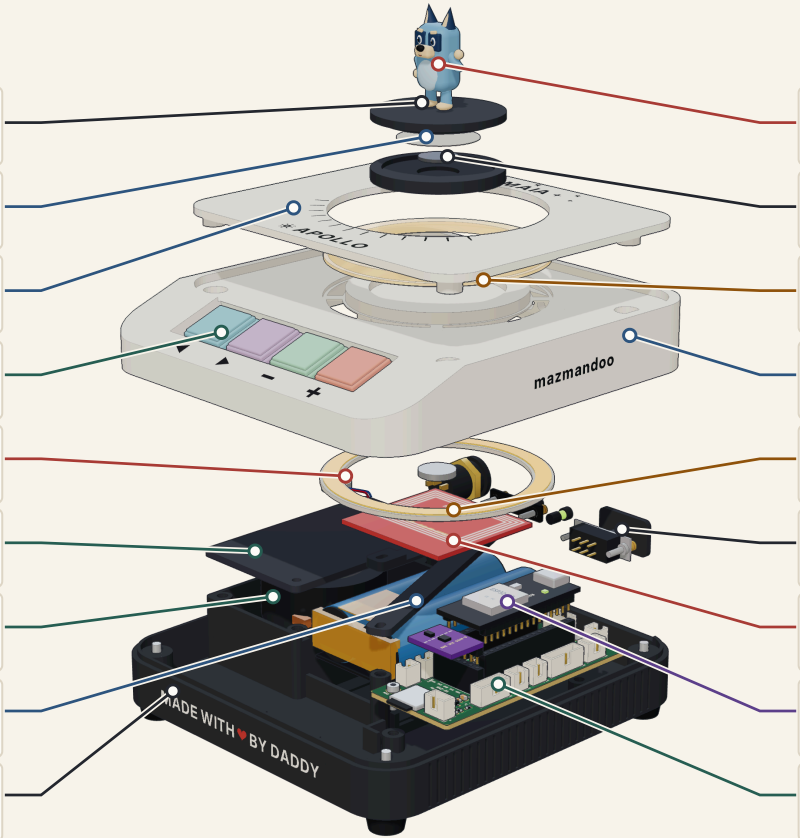
05 **1036 Coin LRA**
C-clip, 45 mm off RF

06 **04: Acoustic Lid**
Seals 55.09 cc cavity

07 **40×20 mm Woofer**
Down-firing + EVA gasket

08 **4400 mAh + 05 Strap**
Diagonal bridged 1S2P pack

09 **03: Charcoal Base**
Ribbed shell + M3×20 feet



Full CAD exploded assembly · Parts 01-09

RF high, shielded bass low

NFC stays up in the lid while heavy cells sit in the base.

Collectible Toy 10
Bonded with gel CA

09: Puck Base + Steel 11
Ø12×1 mm ferromagnetic core

10: Frosted Lens Ring 12
0.95 mm flange (zero glue)

02: Upper Shell Frame 13
mazmandoo & 0.8 mm recess

24-LED Halo Ring 14
Warm 5 V ring (24 LEDs)

3-Station Rear Bay 15
Power, USB-C, Status, Slide

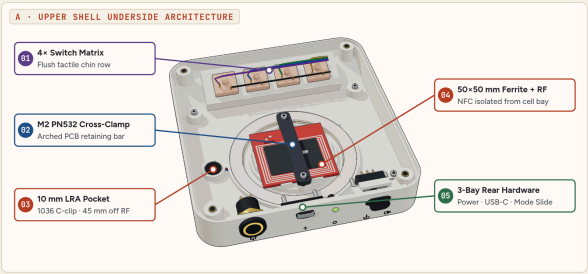
PN532 + Ferrite Sheet 16
NFC tag coil + 0.2 mm shield

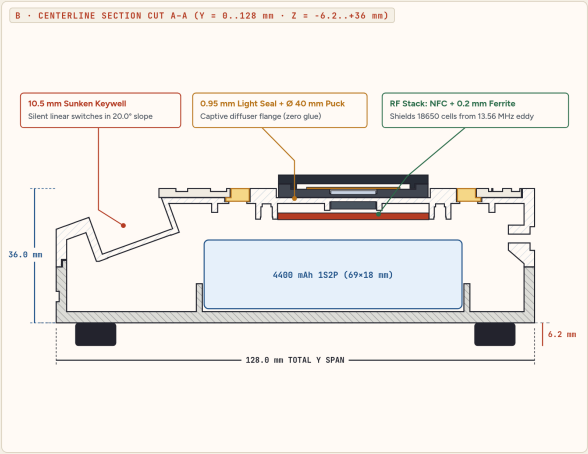
ESP32-S3 + 6-Axis IMU 17
Wi-Fi brain + motion bridge

MAZ-01 Carrier Rev 7.0 18
Custom 32×76 mm 2-layer PCB

RF & compute stack · Parts 10-18

Upper shell pocket & true section A-A

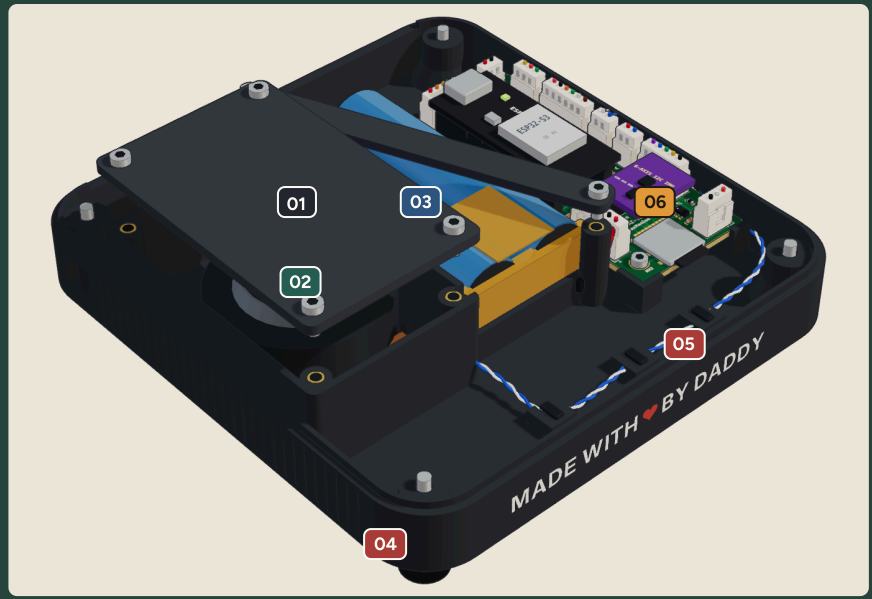




122×128 mm 36.0 mm body + 6.2 mm feet	**0.95 mm Lip** Captive lens, zero glue	**10.5 mm Well** 20.0° silent switch row	**0.2 mm Ferrite** Isolates RF from 18650s

Big warm bass from a sealed 55.09 cc tray

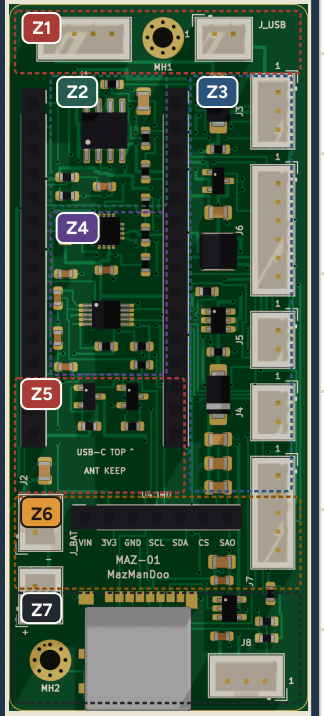
Aiming the 40 mm driver straight at a bedside table lets wood act like a guitar top, while four plump rubber feet open an even 6.2 mm boundary gap underneath.



01 Bolted Chamber Lid Seals 55.09 cc acoustic box	**02** 40 mm Bass Woofer 3 W 4 ohm on 1 mm EVA seal
03 4400 mAh 1S2P Pack Dual cells + diagonal strap	**04** 4× 6.2 mm Feet Lifts woofer for 360° wave
05 Crimson Heart Inlay Front chin flush lettering	**06** MAZ-01 Carrier Bay 5.0 mm open under-pin well

One custom board, seven tidy neighborhoods

Instead of wiring loose hobby boards together, every circuit inside Orbit shares one custom 32×76 mm green mainboard shaped to tuck beside the acoustic chamber.



Z1 North Power & Charging Entry
Rear latch switch, ground mount, and shielded 5 V USB-C entry sit along the north rim.

Z2 TP4056 Smart Li-Ion Charger
Refills the twin battery pack calmly at 1.0 A while driving the dual-color status LED.

Z3 Automatic Handoff & 5.08 V Boost
Plays live off USB-C when plugged in and lifts battery power cleanly to a quiet 5.08 V.

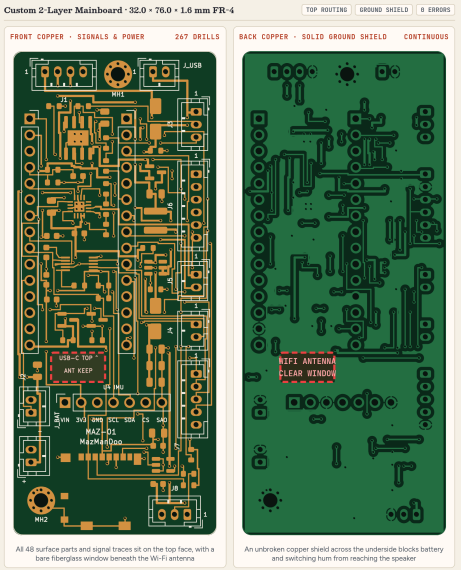
Z4 Digital Audio & Haptic Bridge
MAX98357A drives the 3 W woofer cleanly, while DRV2605L shapes gentle fingertip pulses.

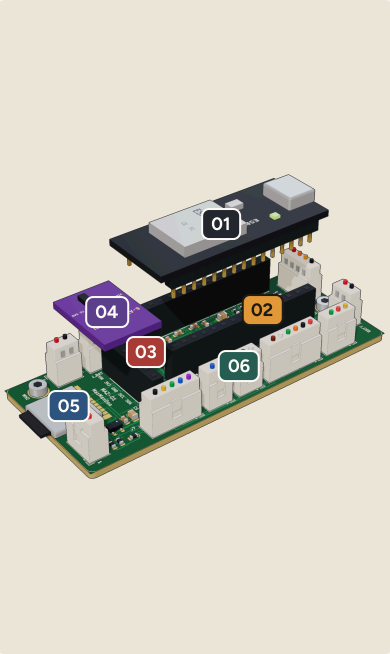
Z5 ESP32-S3 RF Window & Sleep FETs
Twin sockets leave bare fiberglass under the antenna beside the dark-room cutoff FETs.

Z6 Floating Motion Bridge & Side Plugs
A 6-axis tilt sensor spans the center beside keyed JST-PH plugs for tags, keys, and battery.

Z7 MicroSD Card Bay & Halo Buffer
Spring-loaded story card tucked up front beside the buffered 5 V ring plug.

Copper traces, ground shield & three-tier stack





01 ESP32-S3 Brain
USB-C facing North

02 Twin Socket Rails
Surface chips nest below

03 Antenna Window
Bare fiberglass under Wi-Fi

04 6-Axis Motion
Bridges over card bay

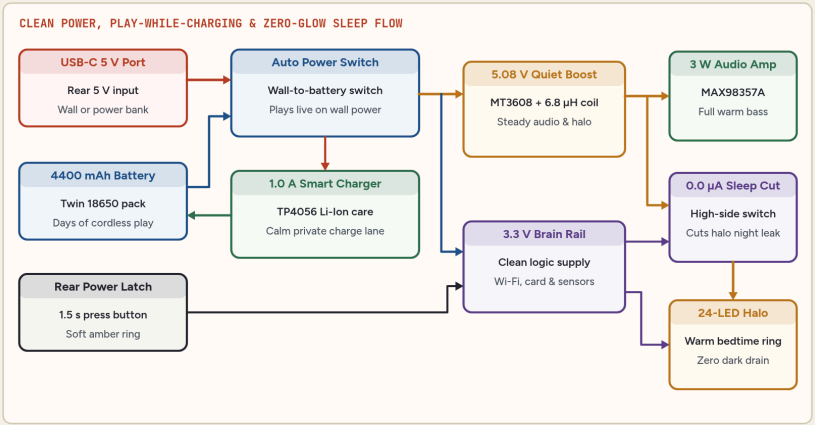
Cu Top-Side Signals
All 48 surface parts on front

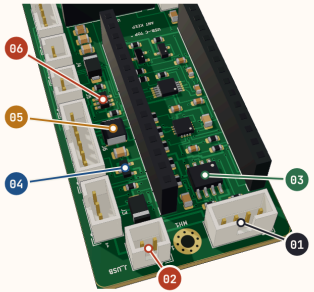
GND Solid Ground Shield
Blocks hum beneath audio

05 MicroSD Slot
Push-push story library

06 Keyed Plug Bay
5.0 mm pin clearance

How power flows from plug to pillow





3D NORTH & EAST POWER BAY

01	**Power Latch**	4-pin rear power button & ring
02	**USB-C Entry**	Shielded 5 V rear charging plug
03	**1 A Charger**	TP4056 battery care chip
04	**Power Gate**	Automatic USB-to-battery switch
05	**Boost Coil**	Shielded 6.8 µH power inductor
06	**5 V Regulator**	MT3608 step-up boost converter

4400 mAh	1.0 A Charge	5.08 V Rail	0.0 µA Sleep
Twin-cell battery pack	Play while plugged in	Steady sound & halo power	Zero overnight LED drain

Built for all-night stories & pitch-black rest

Good bedtime electronics know when to step forward with warm sound and light, and when to disappear completely into a dark room.

Play while charging — Wall-to-battery handoff

Plugging in USB-C powers Orbit straight from the wall while the battery charges calmly on its own 1 A lane, so a story never has to wait.

Steady 5.08 V headroom — Shielded boost

Even as battery charge dips over days of play, a shielded step-up regulator holds the speaker and halo ring at a clean five volts.

True 0.0 µA pitch-black sleep — High-side halo cut

Orbit disconnects the halo's 5 V supply completely when switched off, saving weeks of standby rest in dark rooms.

Twin-cell cordless play — Protected 4400 mAh

Dual 18650 cells nest beside the acoustic box with hardware over-current care for days of unplugged listening.

Stage	Rating	Main Parts	Everyday Benefit
`Battery`	4400 mAh	Twin protected cells	Days of cordless stories & music
`Charging`	1.0 A	`TP4056` + power gate	Play safely while plugged in
`Brain Rail`	3.3 V	`ESP32-S3` + sensors	Whisper-quiet logic & card reads
`Boost Rail`	5.08 V	`MT3608` + 6.8 µH coil	Full warm volume at any charge level
`Sleep Gate`	0.0 µA	Dual `MOSFET` + buffer	Pitch-black room & zero night drain

Quiet layout by design

Grouping the charger and boost coil along the east edge keeps fast switching currents well away from the speaker and toy reader.

One little brain and three quiet digital buses

ESP32-S3 DUAL-CORE BRAIN · OFFLINE STORY ENGINE & WI-FI ROOM CAST
Three quiet digital pathways keep music, touch, and toy tags crisp without analog hum

PURE DIGITAL SOUND · I2S

MAX98357A Digital Amp
Receives clean digital audio bits
Warm mono voice & music

Direct 3 W drive

Sealed 40 mm Bass Woofer
3 W downward speaker driver
Zero background hiss at night

TOUCH & MOTION · I2C

DRV2605L + 10 mm LRA
Gentle pulse when a puck lands
Softer than any buzzer

6-Axis Motion Bridge
Senses gentle handling & tilt
Mounted high over the SD bay

TOYS & STORIES · SPI

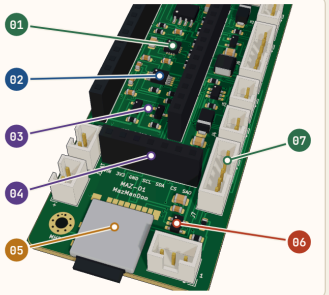
PN532 Magnetic Puck Reader
Reads NTAG215 toy tag at touch
Ferrite foil shields the battery

Push-Push MicroSD Library
Holds hundreds of bedside tales
Protected beside the keywell

DIRECT SWITCH & KEY INPUTS · GPIO

Rear Mode Slide Switch (J2 · Direct GPIO)
Offline SD Card or Room Cast · No screen
Tied to ESP32-S3 pin 11

4× Quiet Pastel Chin Keys (J7 · Direct GPIOs)
Back · Next · Softer · Louder
Damped tactile chin row



3D CENTER & SOUTH SIGNAL BAY

01	**Digital Amp**	MAX98357A 3 W speaker chip
02	**Haptic Driver**	DRV2605L gentle pulse controller
03	**Sleep Switch**	Cuts halo ring to 0.0 µA at night
04	**Motion Bridge**	6-axis sensor straddling the bay
05	**MicroSD Slot**	Spring-loaded offline story card
06	**Halo Buffer**	Clean 5 V data for 24 warm LEDs
07	**Side Sockets**	Keyed JST-PH peripheral plugs

I2S **Hum-Free Audio** — Digital bits straight to amp

I2C **Touch & Motion** — Gentle tap pulse & tilt

SPI **Instant Toy Read** — Fast tag & story card link

Thoughtful silicon, chosen for screenless play

Forty-eight surface parts and thirteen plug sockets share the board, each chosen so Orbit feels instant, tactile, and calm in small hands.

Digital sound, zero hiss — MAX98357A
Sending pure digital audio straight to the amp avoids analog wire hum during quiet spoken stories.

Soft thrum on every tap — DRV2605L
With no screen to check, a 10 mm coin motor gives a gentle pulse the moment a character puck lands.

Stories anywhere, Wi-Fi home — ESP32-S3
Favorites live offline on a MicroSD card for travel, with Wi-Fi ready for whole-room music at home.

Stacked to save space — 3-tier sockets
Floating the brain and motion sensor on sockets saves precious room right beside the bass chamber.

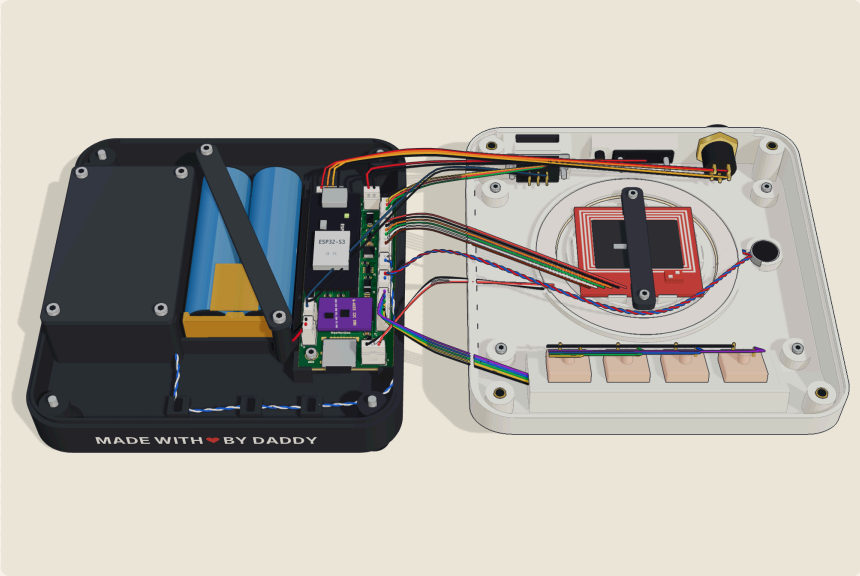
Subsystem	Main Part	Role Inside Orbit
Brain	ESP32-S3-Nano	Offline stories & Wi-Fi room cast
Power	TP4056 + MT3608	1 A charge share & 5.08 V steady rail
Sound	MAX98357A	Drives sealed 40 mm downward woofer
Touch	DRV2605L + IMU	Coin tap pulse & gentle tilt sense
Toys & Card	PN532 + MicroSD	Instant puck tag & offline library
Mainboard	MAZ-01 Rev 7.0	32×76 mm top-side + 13 keyed sockets

Single-sided for easy care

Every chip sits on the top face above an unbroken ground shield, leaving 5.0 mm of clear pin space below.

Ten keyed harnesses, built to service

Four underside bolts hinge Orbit open like a book. Every upper peripheral unplugs cleanly at locked white JST-PH sockets without cutting or desoldering a wire.



Subsystem	Specification	Architecture Benefit
`Size`	122 × 128 × 36 mm (+6.2 mm feet)	Pillow edges, zero exposed deck screws
`Audio`	55.09 cc sealed + 40 mm driver	Downward bass + 1 mm EVA gasket
`Power`	4400 mAh pack + 5.08 V boost	1 A charge share + 0.0 µA night sleep
`Radio & Storage`	Tag coil + card slot + Wi-Fi	Offline cards or multi-room casting
`Service`	Brass thread inserts + 10 plugs	Full tear-down in under two minutes

Ready beside every pillow

No glowing screens and no tangled menus: just warm wood-tone clicks, soft bedtime music, and a gentle glow fading down beside sleeping toys.



Pick a buddy Tap

Set any glued figure on the ring and Orbit hums a cozy pulse to start its song.

Drift to sleep 0.0 µA

Slide between local stories or room casting, then click off for zero-leak rest.

Made with love for Maia and Apollo

Place a favorite toy on the ring, press a quiet key, and let the warm light and cozy speaker play tonight's story.

Orbit shell
Screenless acoustic keepsake

Growing shelf
New toys join every season

Sealed sound
55.09 cc downward chamber

Custom PCB
MAZ-01 Rev 7.0 2-layer carrier

Seven stars above, sunbeams below, always ready for one more song.