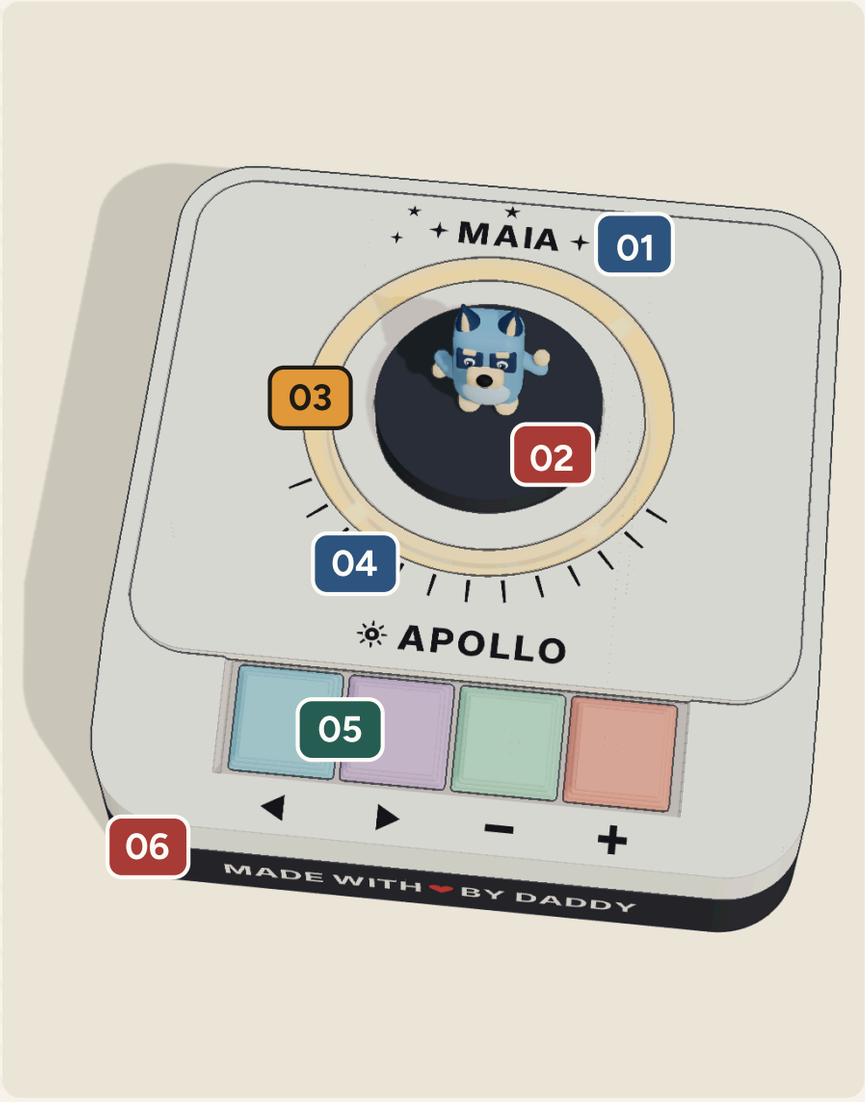
Orbit

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

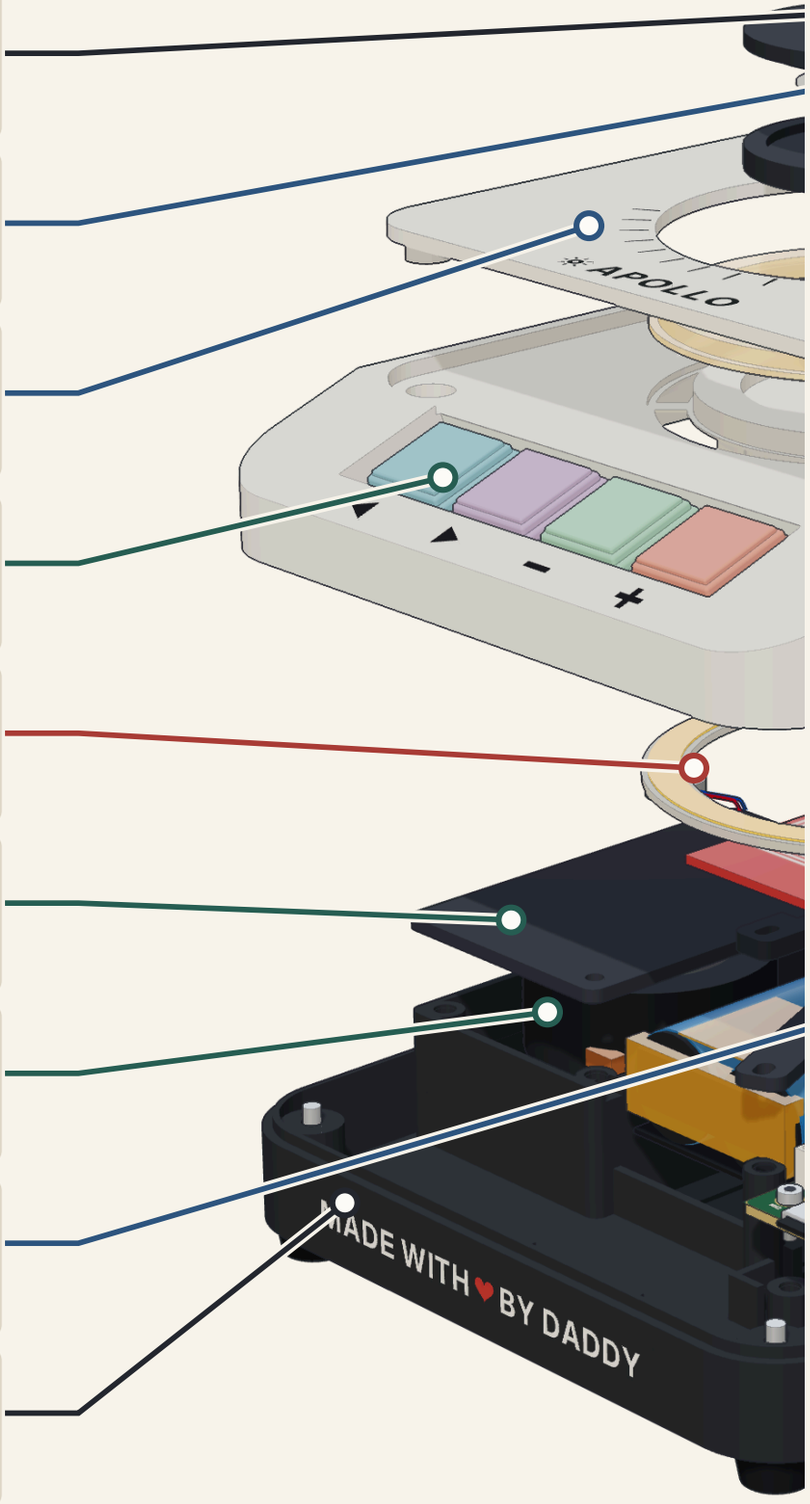
05 **1036 Coin LRA**
C-clip, 45 mm off RF

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

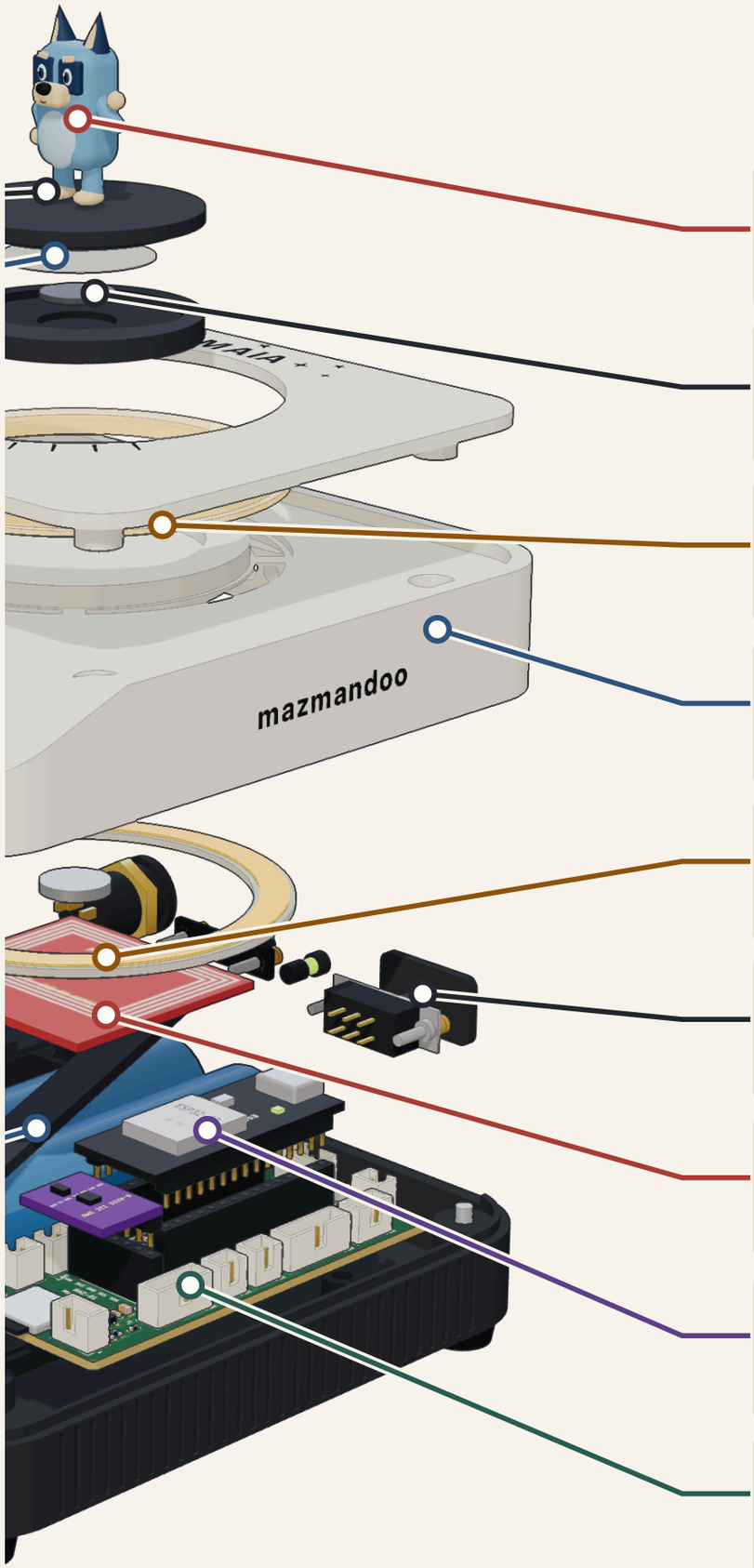
09 **03: Charcoal Base**
Ribbed shell + M3×20 feet



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

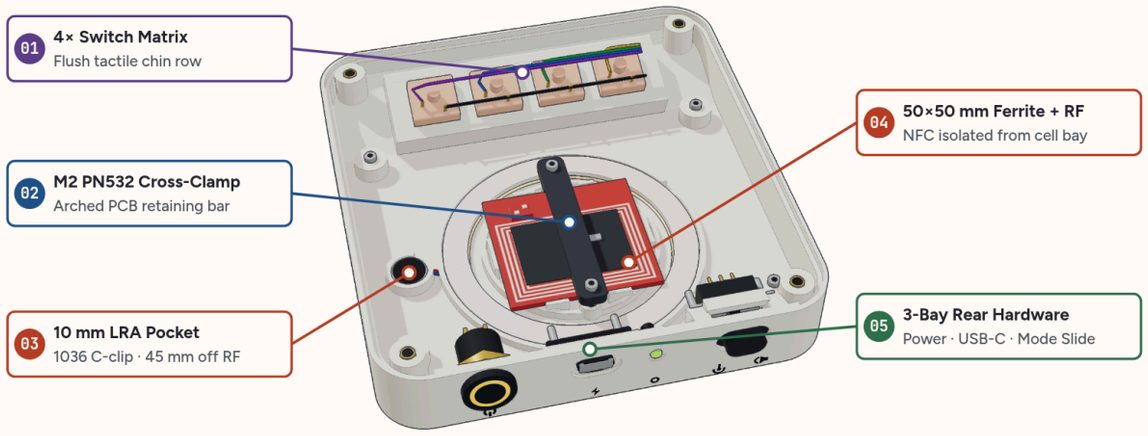
PN532 + Ferrite Sheet 16
NFC tag coil + 0.2 mm shield

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

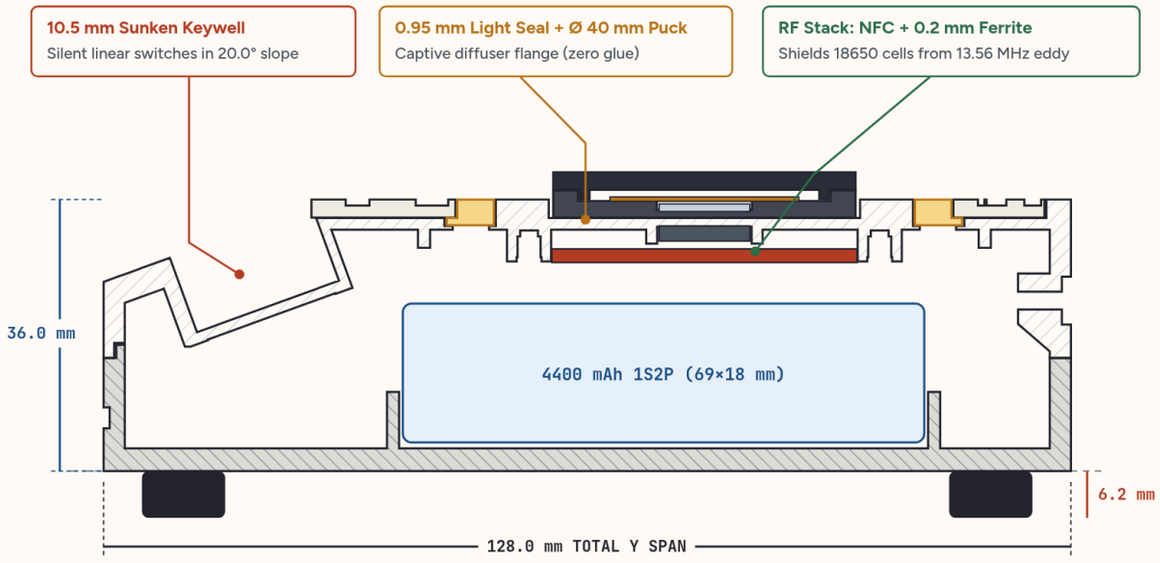
MAZ-01 Carrier Rev 7.0 18
Custom 32×76 mm 2-layer PCB

Upper shell pocket & true section A-A

A · UPPER SHELL UNDERSIDE ARCHITECTURE



B · CENTERLINE SECTION CUT A–A (Y = 0..128 mm · Z = -6.2..+36 mm)



122×128 mm
36.0 mm body + 6.2 mm feet

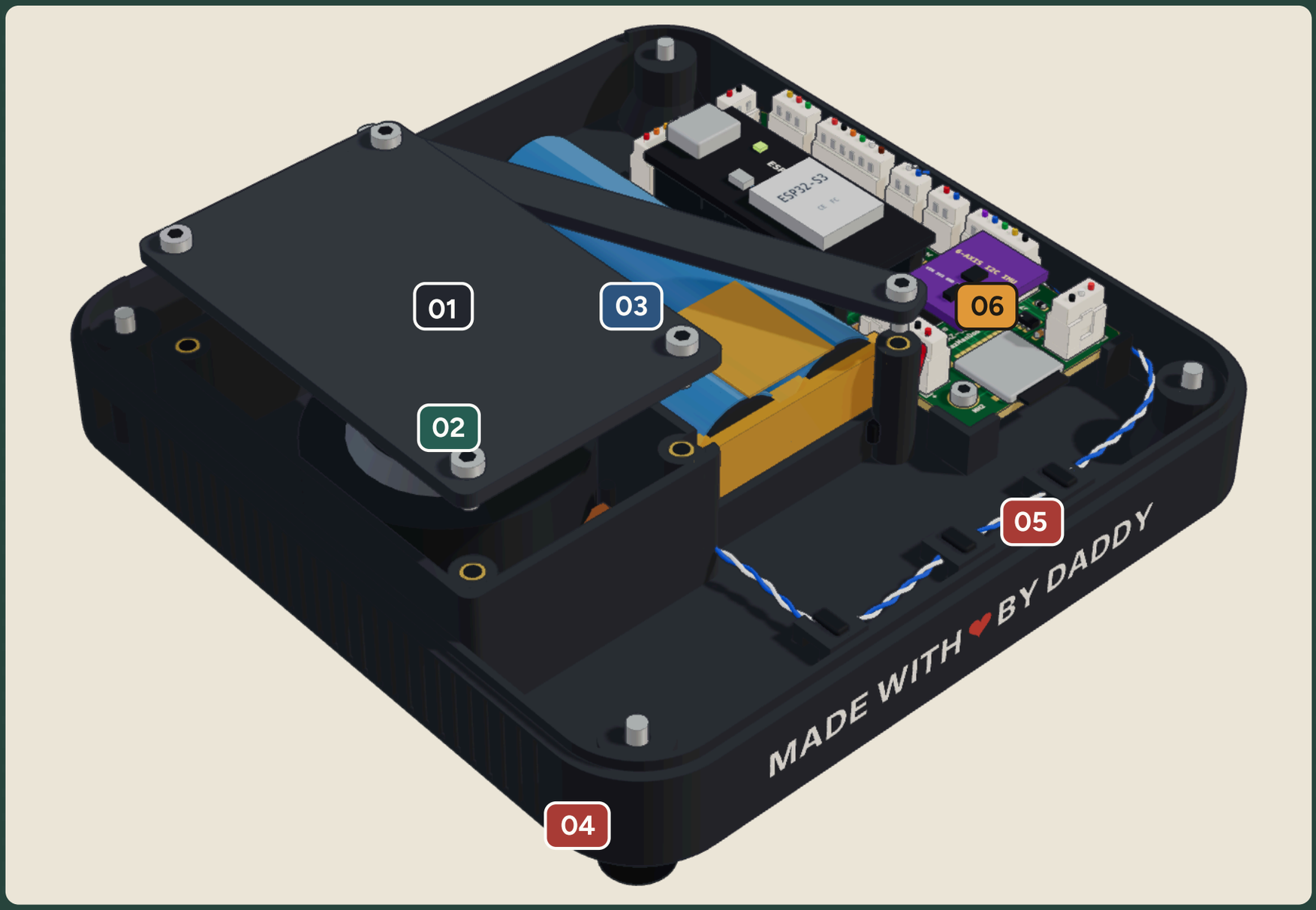
0.95 mm Lip
Captive lens, zero glue

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

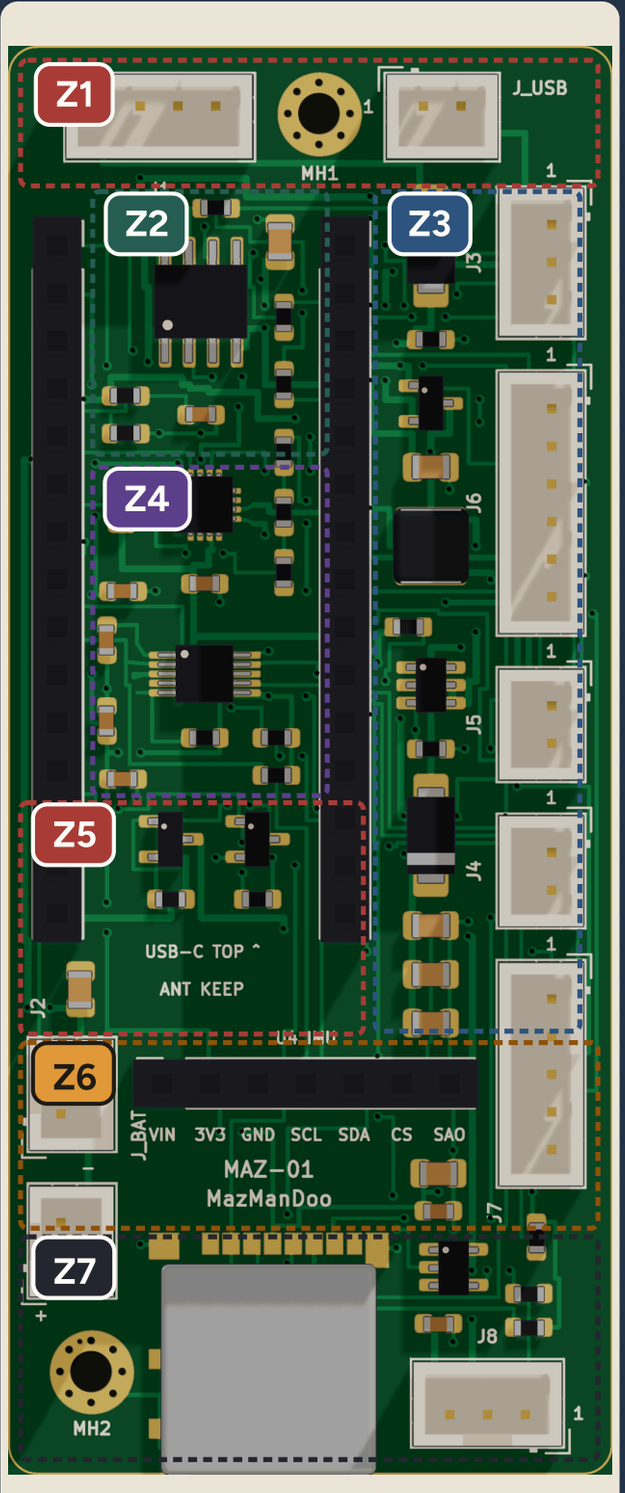
04 4× 6.2 mm Feet
Lifts woofer for 360° wave

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.

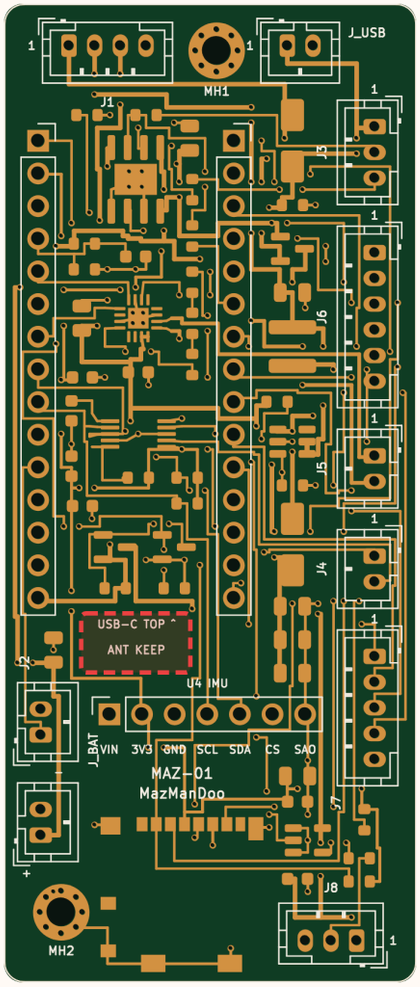
Z7 MicroSD Card Bay & Halo Buffer
Spring-loaded story card tucked up front beside the buffered 5 V ring plug.

Copper traces, ground shield & three-tier stack

Custom 2-Layer Mainboard · 32.0 × 76.0 × 1.6 mm FR-4

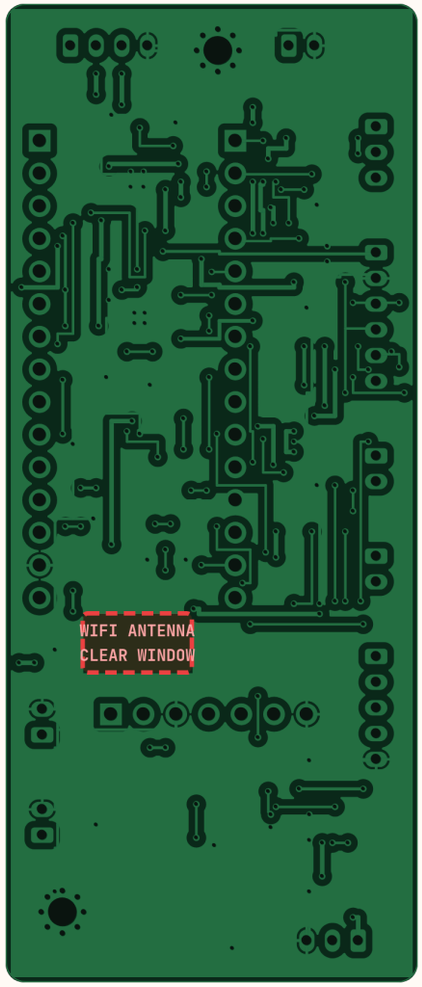
TOP ROUTING · GROUND SHIELD · 0 ERRORS

FRONT COPPER · SIGNALS & POWER — 267 DRILLS

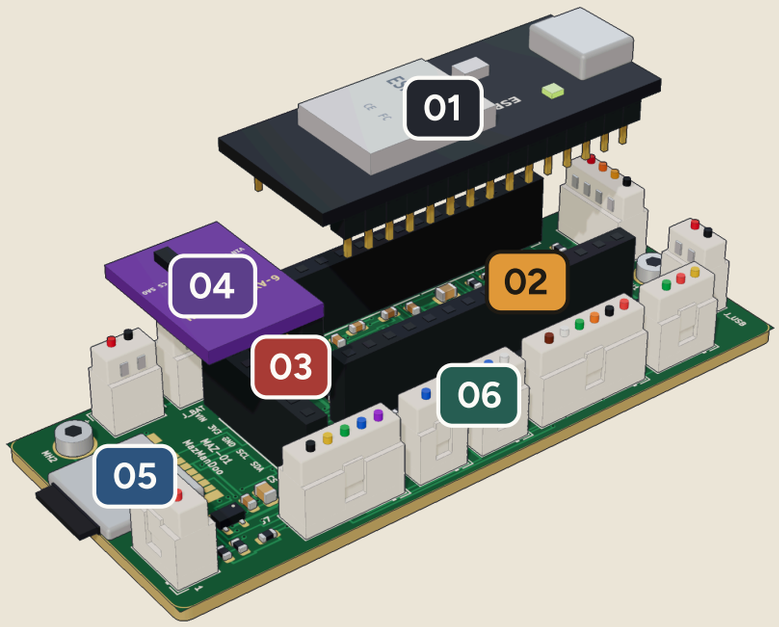


All 48 surface parts and signal traces sit on the top face, with a bare fiberglass window beneath the Wi-Fi antenna

BACK COPPER · SOLID GROUND SHIELD — CONTINUOUS



An unbroken copper shield across the underside blocks battery and switching hum from reaching the speaker



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

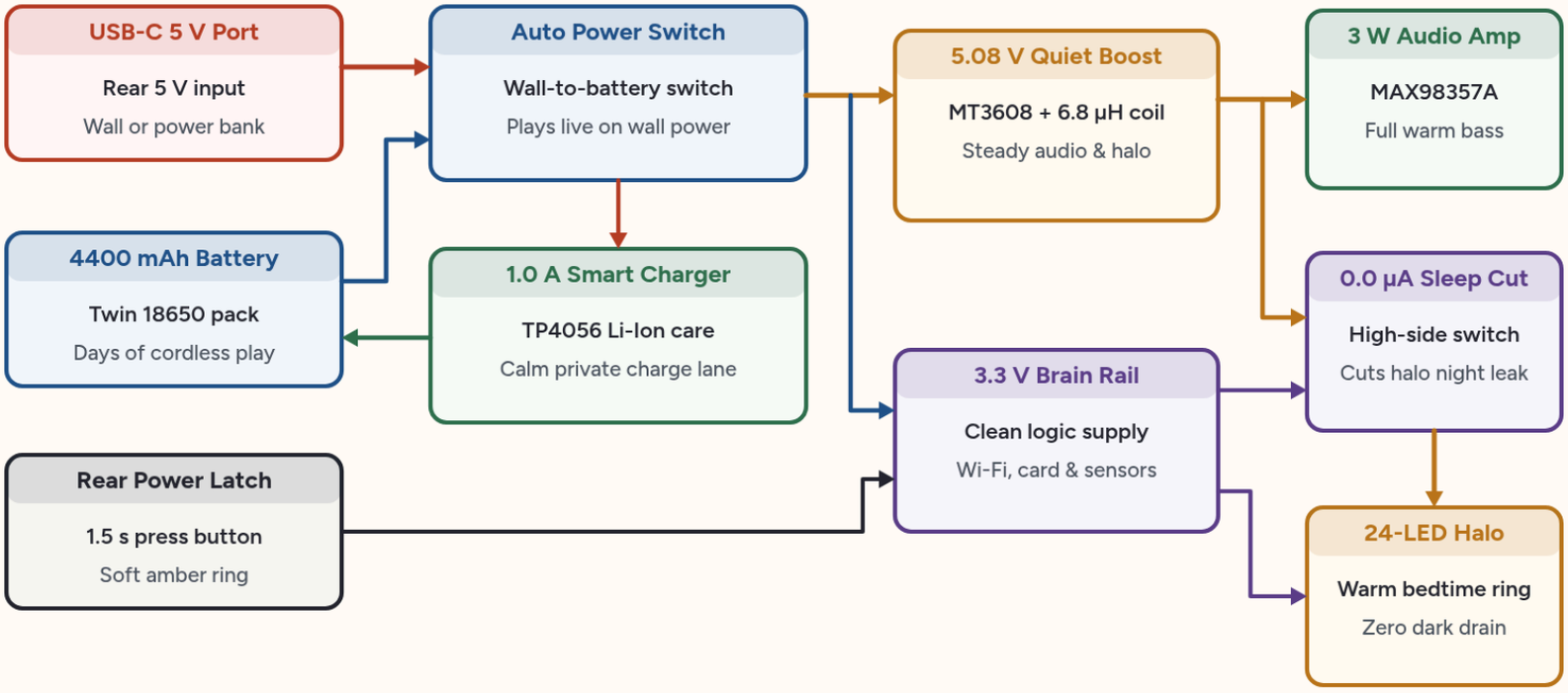
GND Solid Ground Shield — Blocks hum beneath audio

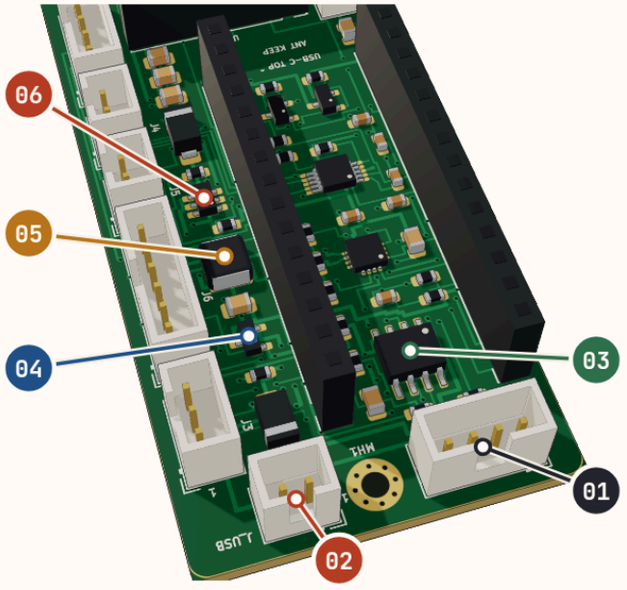
05 MicroSD Slot — Push-push story library

06 Keyed Plug Bay — 5.0 mm pin clearance

How power flows from plug to pillow

CLEAN POWER, PLAY-WHILE-CHARGING & ZERO-GLOW SLEEP FLOW





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)

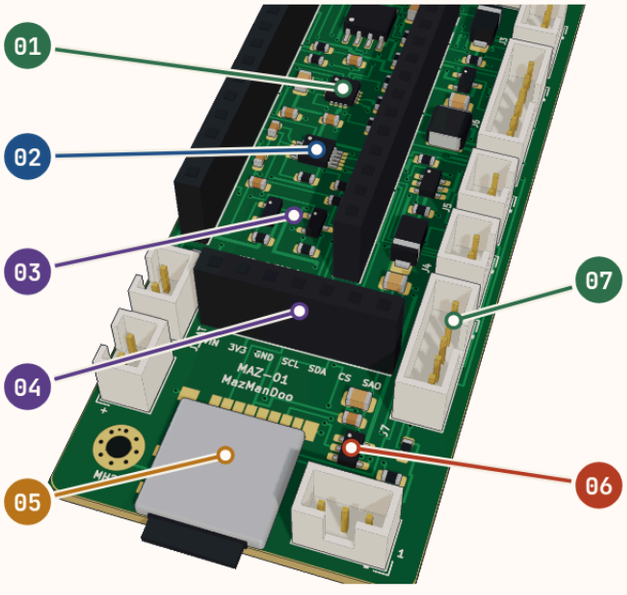
Offline SD Card or Room Cast · No screen

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.

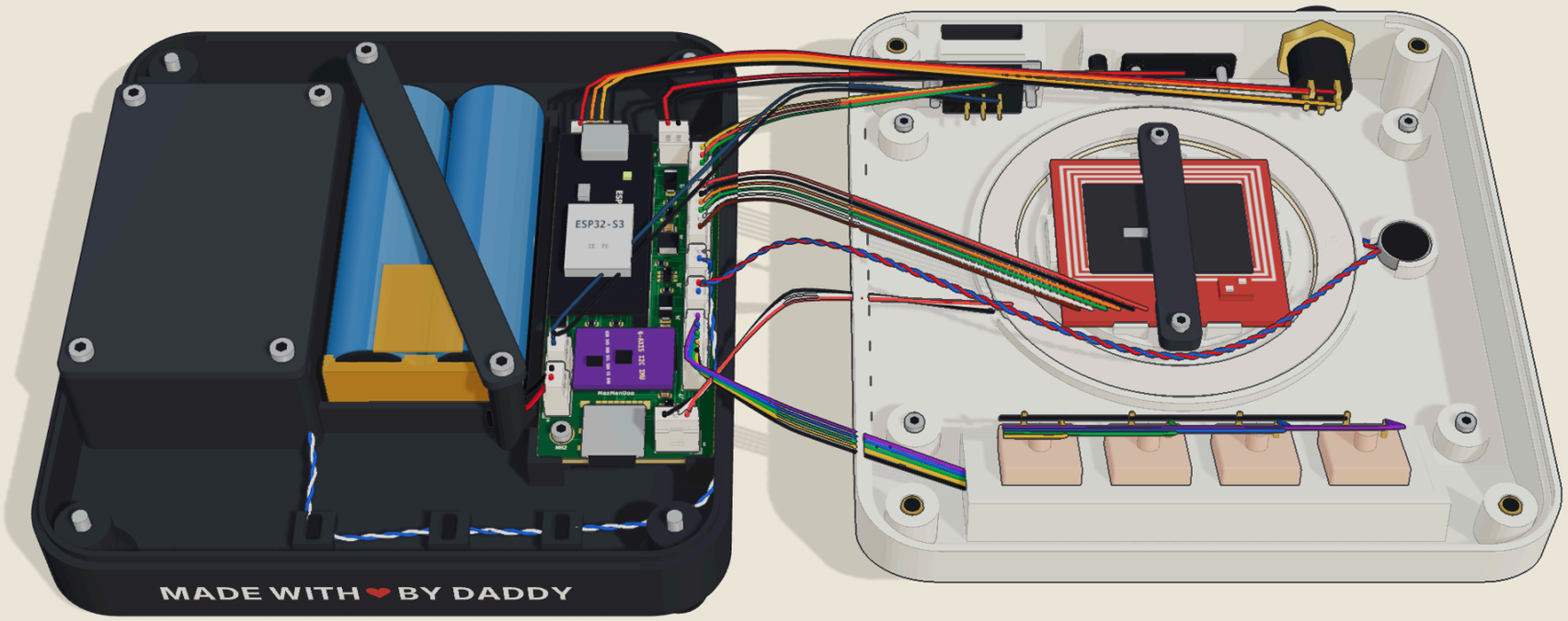
Subsystem	Main Part	Role Inside Orbit
Brain	ESP32-S3-Nano	Offline stories & Wi-Fi room cast
Power	TP4056 + MT3608	1 A charge share & 5.08 V steady rail
Sound	MAX98357A	Drives sealed 40 mm downward woofer
Touch	DRV2605L + IMU	Coin tap pulse & gentle tilt sense
Toys & Card	PN532 + MicroSD	Instant puck 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.