BUILD GUIDE / 01

Breathe

Assemble your kit: the split-flap version with the screwless servo cradle.



Start with the parts. Finish with a free-moving flap.

Follow the numbered stages in order. Keep USB disconnected while fitting parts or changing connections. Colours in the drawings are examples; your chosen colours may differ.

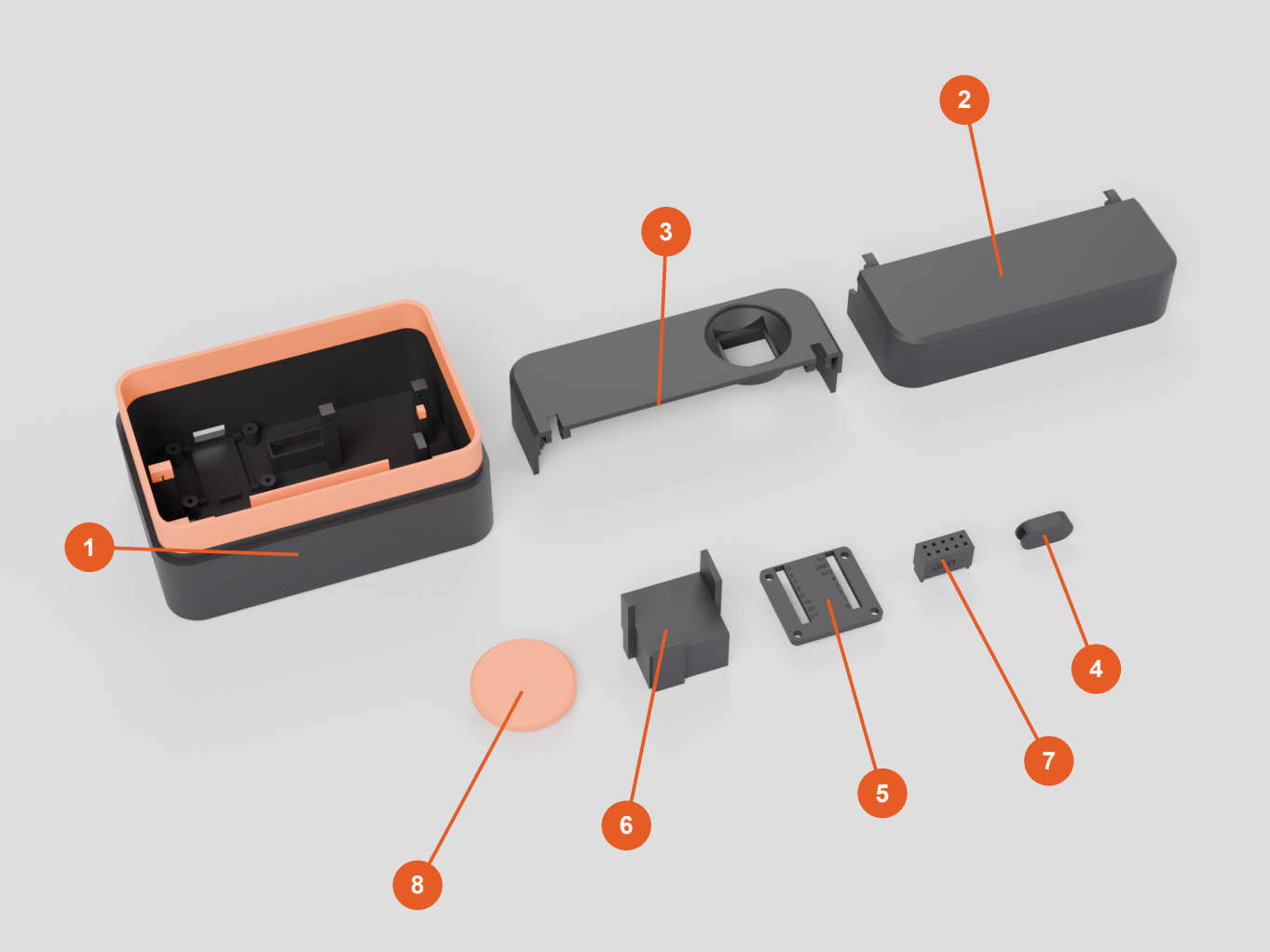
ONE NECESSARY SETUP PAUSE

The servo needs a known closed position before its arm is fitted (page 6). Firmware installation and app setup are separate. Stop at that step until your firmware can command the closed position.

BEFORE YOU START / PRINTED PARTS

Lay out the eight printed parts.

Match shapes, not colours. The base and accent band are treated as one finished printed assembly.



1 Base
Front light channel and rear USB opening.

2 Moving flap
The plain front half of the top.

3 Fixed back half
The half with the switch opening.

4 Horn tip
Small sleeve for the servo arm.

5 C3 frame
Flat retainer with engraved pin labels.

6 Servo cradle
U-shaped support for the SG90.

7 Power bus holder
Two rows of five pin openings.

8 Button
Round cap for the MX switch.

Supplied hardware: 4 x M2 x 4-6 mm frame screws and two ready-to-fit hinge pins (1.75 mm diameter, about 7.5 mm long).

STAGE 1 / PREPARATION

Prepare the electronics.

Lay out the supplied electronics, headers, leads and heat-shrink before you solder.

Part	Identify it before you solder
ESP32-C3 SuperMini	USB-C board; header pins face upward.
SG90 servo + long single arm	Confirm the supplied arm and centre fastener.
8-LED WS2812 stick	57.2 x 10.6 mm; use DIN, 5V and GND.
MX switch + passive buzzer	Bare 12 mm buzzer, not a buzzer module.
Bus pins + connecting leads	Supplied bus pins, wire, female Dupont leads and heat-shrink.

Bring: soldering iron and solder, small Phillips screwdriver, flush cutters, tweezers, hot glue gun, hot glue, super glue and a USB-C data cable.

1 **Solder the leads before mounting the parts.**

Fit the supplied C3 headers long side up if not already fitted. Use the supplied leads for the LED stick, switch and buzzer, leaving slack for the top.

2 **Build two separate power rows.**

If the bus is already assembled, inspect it and continue. Otherwise insert the supplied pins from below. Solder each row separately, insulate with the supplied heat-shrink and retain with hot glue. Follow the 5V and GND labels.



Five pins joined within each row.

Rows stay electrically separate.

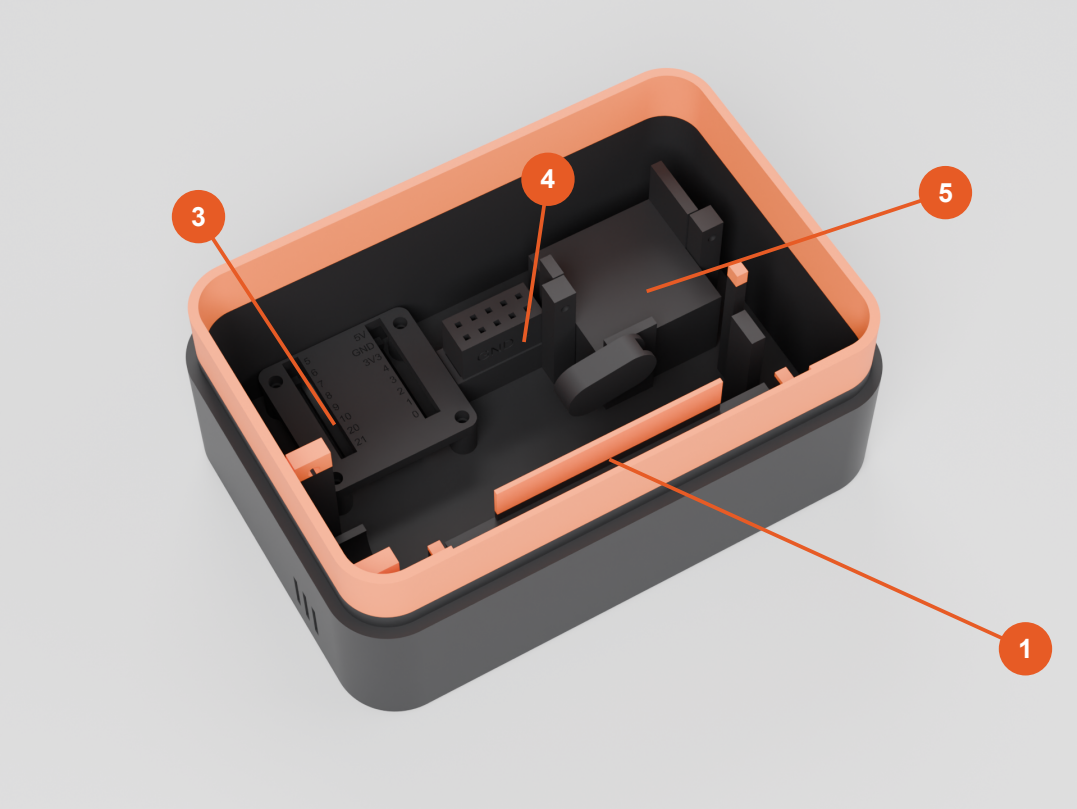
CHECK BEFORE CONTINUING

No exposed conductor can bridge the 5V and GND rows. Each bus pin stays in place when a connector is pushed on. USB remains unplugged.

STAGE 2 / BASE ASSEMBLY

Fit the parts into the base.

CAD orientation view. Electronic modules and leads are omitted from this image.



1 **LED stick**

Seat it in the front channel, LEDs outward. Route leads over the end posts and down the wall.

2 **Buzzer**

Lower it into the left-wall cradle, face toward the wall and leads inward. Retain with a little hot glue.

3 **C3 board + frame**

Tilt the board USB-first into the rear opening. Fit the frame using all four M2 screws; stop when snug.

4 **Power bus holder**

Seat it in the slot beside the C3. Keep its engraved row labels visible.

5 **Servo + cradle**

Set the cradle between the posts. Seat the SG90 with its tabs in front of the posts. Leave its arm off; this cradle uses no servo mounting screws.

STAGE 3 / CONNECTIONS

Connect one circuit at a time.

Read the pin labels on the actual board. This table is a connection map, not a drawing of header positions.

From	To
C3 5V	Power bus 5V row
C3 GND	Power bus GND row
Servo signal / power / ground	GPIO10 / bus 5V / bus GND
LED stick DIN / 5V / GND	GPIO4 / bus 5V / bus GND
Switch, one leg / other leg	GPIO3 / GPIO6
Passive buzzer + / -	GPIO5 / bus GND

PAY ATTENTION TO THE SWITCH

GPIO6 is used as the switch return in this documented build. It must be configured LOW by the matching firmware. Do not treat it as an ordinary ground pin or use unrelated firmware.

Before connecting USB

- [ ] Check 5V and GND at both ends of every power lead.
- [ ] Use the LED stick input marked DIN, not DOUT.
- [ ] Confirm each connector follows the table, using pin labels rather than wire colours.
- [ ] Route leads away from the servo arm, flap hinges and top clips.

Your firmware must use this pin map. Check both the wire connections and the configured pin numbers before powering the finished build.

STAGE 4 / MOVING PARTS

Set the arm. Assemble the top.

Stop at the setup handoff until a known closed servo position is available.

SETUP HANDOFF: SERVO POSITION

With the arm still removed, use your firmware to command the servo to its closed position. The separate firmware outline includes a calibration control. There is no universal pulse value: stop here until a known closed position is available.

1 **Fit the servo arm at the closed position.**

Disconnect USB before fitting it. Point the long arm toward the hinge side, slightly downward, without turning the servo shaft. Confirm the supplied arm fits and use its matching retaining fastener. Slide the printed horn tip onto the end and fix it with one small drop of super glue.

2 **Build the top beside the base.**

Clip the MX switch into the fixed back half and press the button onto its stem. Place the flap between the hinge cheeks. Insert one supplied ready-to-fit hinge pin from each side.



Exploded CAD view shows the top, button and base. Internal electronics and wires are omitted.

Check the loose top first.
The flap should swing freely on its two pins. The button should move without rubbing. Keep glue away from the hinges and switch.

3 **Seat the fixed back half on the base.**

Route the switch leads with enough slack. Keep every lead clear of the clips and moving arm. Press the back half into place without forcing the flap.

STAGE 5 / INSPECTION

Check before the first full motion.

A finished enclosure still needs the separate setup and calibration checks.

- [ ] The USB opening is clear and the C3 frame sits flat.
- [ ] The power rows are insulated; connectors are fully seated.
- [ ] The servo is supported by the cradle. Its arm and printed tip are secure.
- [ ] Both hinge pins are seated and the flap moves without catching.
- [ ] The switch leads stay clear of the hinge, arm and top clips.

FIRST POWERED MOVEMENT

Use the matching setup procedure for small, slow movements. Stop if the mechanism binds, the servo keeps pushing against a stop, or the board repeatedly restarts. Recheck fit and calibration before continuing.

Continue with your firmware setup

- [ ] Use the pin map on page 5, including GPIO6 configured LOW for the switch return.
- [ ] Calibrate closed and open positions in small increments. The arm should move freely and must not keep pushing against a stop.
- [ ] Test the button, LEDs and buzzer separately before enabling your own notifications.
- [ ] If a part is missing or its fit differs from these drawings, contact Filamenting before forcing it into place.

Setup: filamenting.com/guides/breathe.html#firmware
Help with your kit: filamenting.com/contact

Bought print files? Use the printing instructions supplied with your download before starting this assembly guide. The kit already contains the printed parts.