Rouse Build Guide

Print, wire and assemble your own Rouse alarm clock

For Rouse firmware 2.0.0 · November 2026

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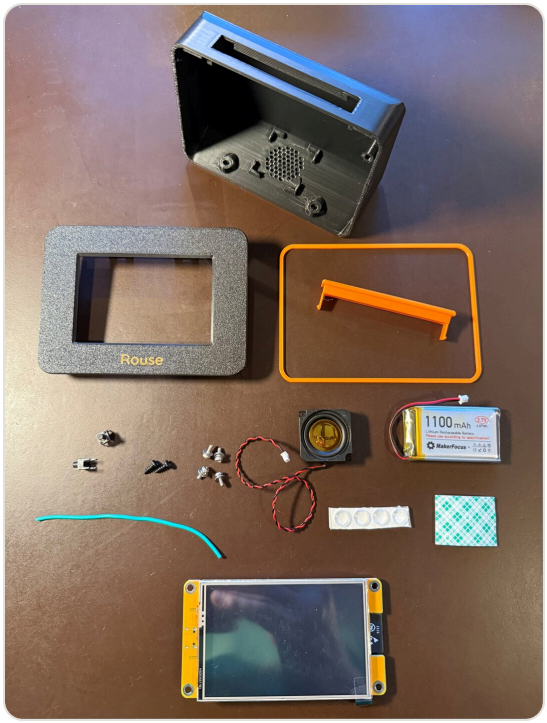
What you'll build

Rouse is an alarm clock built around a ready-made ESP32 touch-screen board, a 3D-printed case, a small speaker, an optional snooze bar and an optional backup battery. There is no circuit board to make: the wiring is two small switches and three plugs. Plan on less than an hour, plus printing time.



Everything for one clock (shown with the CYD board)

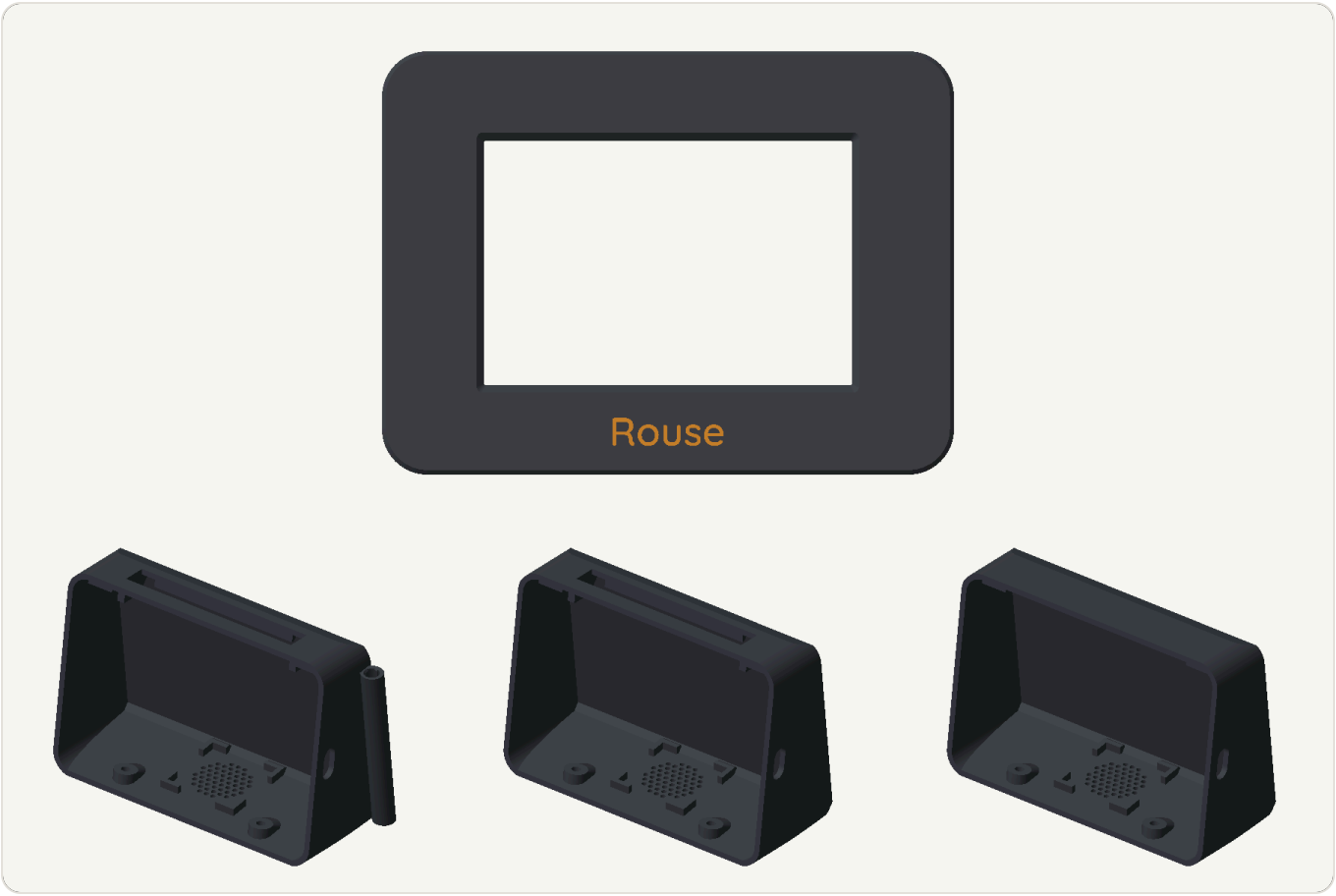
This guide covers three boards, and other boards that are the same size with the same mounting holes and screen position. They all run the same Rouse firmware:

Board	Case	Notes
Freenove FNK0104N, 3.5″	Rouse case	Glass touch screen, room for 64 photos. The board used in the pictures.

Board	Case	Notes
CYD (Hosyond / LCDwiki E32R35T), 3.5″	Rouse case	Pressure-sensitive touch screen (comes with a stylus); room for 3 photos; no internet radio. The least expensive board, with the simplest sound: alarms play at 25% volume or more, sleep sounds at 15% or more.
Waveshare ESP32-S3-Touch-LCD-3.5-C, in Waveshare's enclosure	Rouse case, Waveshare version	No wiring and no snooze bar: tap the case to snooze. The enclosure fits into a Rouse case made for it (see The Waveshare board).

The Freenove and CYD boards have the same size, mounting holes and screen position, so **one Rouse case fits both**. It comes in three versions:

- **With snooze bar opening and stylus holder:** for the CYD, whose stylus has a place to live.
- **With snooze bar opening:** for any board.
- **Without snooze bar opening:** touch screen only; no switches to wire.



The Rouse case: bezel with the name inlay (top) and the three body versions

Parts

One clock needs:

Part	Qty	Notes	Example
Display board	1	One of: Freenove ESP32-S3 Display 3.5″ (FNK0104N); Hosyond 3.5″ ESP32 touch screen (CYD); Waveshare ESP32-S3-Touch-LCD-3.5-C (the version in Waveshare's enclosure, not the bare board)	Freenove · CYD · Waveshare
Tactile switch, 6 × 6 mm base, 8 mm stem (6×6×8)	2	For the snooze bar. Skip for the case without snooze bar opening, and for the Waveshare.	Switches
Speaker, 8 Ω 2 W, 28 × 28 mm, with 2-pin 1.25 mm plug	1	Plugs straight into the board. Fits the case as designed.	Speaker
Or, for more volume: speaker, 4 Ω 3 W, 28.2 × 31 × 15.3 mm, with 2-pin 2.0 mm plug	1	Louder and fuller. Its plug is the larger 2.0 mm size, so it needs a 1.25 mm lead spliced on (see Speaker). Fits the case slightly tilted and glued.	Louder speaker (choose **3W 4Ohm**)

Part	Qty	Notes	Example
2-pin JST PH1.25 leads with wires (“pigtails”)	1	Only for the 4 Ω speaker. Usually sold as plug-and-socket pairs; use the half whose plug matches the 8 Ω speaker’s (it fits the board’s **SPEAKER** connector).	Leads
Heat-shrink tubing, about 2–3 mm	2 short pieces	Only for the 4 Ω speaker: covers the two soldered joints.	
LiPo battery, 3.7 V single cell, 1100–2000 mAh, with 2-pin 1.25 mm plug	1	Optional backup; bigger runs longer. The board charges it. Any brand works if it has the 1.25 mm plug and fits (up to about 50 × 34 × 10 mm); packs of two or four cost less per battery. **Check the polarity before plugging it in** (see Battery).	Battery
Pan head screws, M2.5 × 6	4	Hold the board in the bezel.	M2.5 screws
Self-tapping screws, M3 × 8	2	Close the case from underneath.	M3 screws
Adhesive bumper pads, 8 mm	4	Feet.	Bumpers

Part	Qty	Notes	Example
Double-sided foam tape, about 50 × 30 mm	1 piece	Holds the battery.	Foam tape
Hook-up wire, 22 AWG stranded	about 20 cm (8″)	Between the two switches.	Wire
Filament (PLA or PLA+)	about 100 g	One main color and one accent color.	

The links are examples of what was used for the clock in this guide; equivalent parts work just as well.

The cable for the snooze bar comes with the board. The Freenove and CYD boards include short cables with plugs (pigtails) for their small connectors. One of them connects the snooze bar to the board.

Tools

- 3D printer (any; a two-color printer, such as one with an AMS, can print the name on the bezel in the accent color)
- Soldering iron and solder
- Small Phillips screwdriver
- Wire cutters and strippers
- Hot glue gun (or a small piece of foam tape) for the speaker
- A heat gun or lighter for the heat-shrink (only for the 4 Ω speaker)
- A computer with Chrome or Microsoft Edge and a USB-C **data** cable, to install the firmware

Printing the case

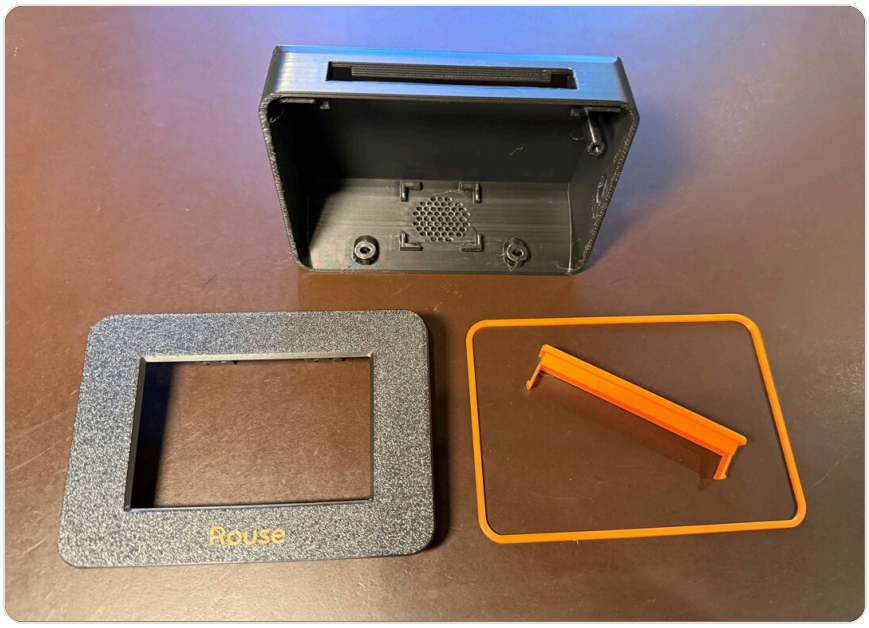
Download **Rouse-case-v1.1.3mf** (Bambu Studio and OrcaSlicer) or the STL files (any slicer) from rouseclock.com/downloads, or print it from MakerWorld. The 3MF has every part on its own plate, already turned the right way up:

Plate	Part	Color
1	Case with snooze bar opening and stylus holder	Main
2	Case with snooze bar opening	Main
3	Case without snooze bar opening	Main
4	Bezel, with the “Rouse” name inlaid	Main, name in accent
5	Bezel, with the name engraved	Main
6	Band ring and snooze bar	Accent
7–10	The same parts for the Waveshare version: case, bezel (inlaid or engraved name), band ring	as above

Print one case (plates 1–3), one bezel (plate 4 or 5), and plate 6. If your case has no snooze bar opening, delete the snooze bar from plate 6 before printing.

- **Material:** PLA or PLA+, 0.2 mm layers, 3 walls, 15 % infill. The clock in this guide is charcoal with an orange accent.
- **Supports:** none except two small areas the 3MF already marks: the top edge of the USB opening and the front edge of the snooze bar opening. With the STL files, add supports at those two places yourself.
- **The name:** plate 4’s bezel prints face down with “Rouse” in its first layers as a second color, for printers that can change filament (such as an AMS). On a single-color printer, use plate 5:

the name is engraved 1 mm into the face and reads by its shadow.



The printed parts

> **Check the stylus holder** (plate 1 only). The CYD's stylus should slide into the holder and stay put. Printers differ a little; if it is too tight, run a 13/64″ (5.2 mm) drill bit through it by hand.

Wiring

All the connections plug into the back of the board except the snooze bar, which needs a few solder joints.

Snooze bar switches

Skip this if your case has no snooze bar opening.

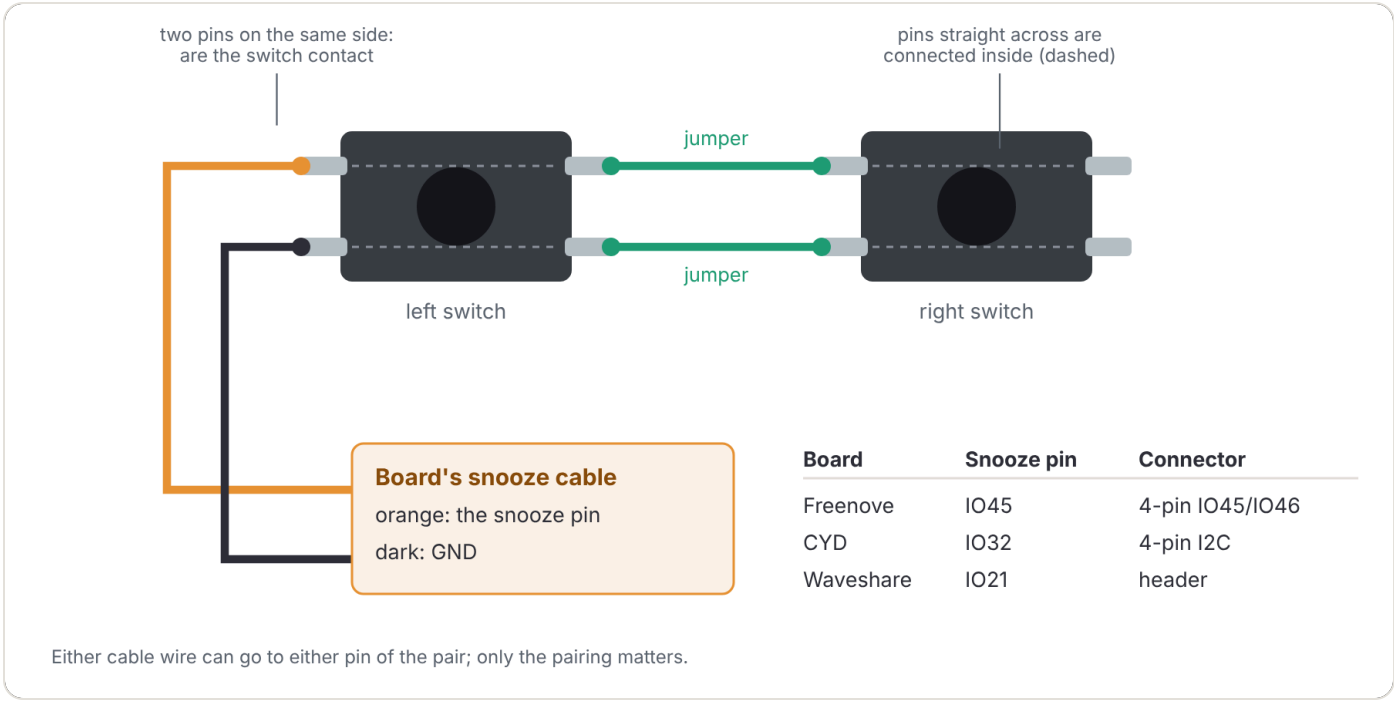
Look at a switch from below. Its body is a rectangle, with two pins coming out of each of the two long sides:

- The **two pins on the same side** (the ones closer together) are the two sides of the switch contact. Pressing the button connects them.
- The **pins straight across** from each other, on opposite sides, are connected inside the switch. They let the connection pass through to the next switch.

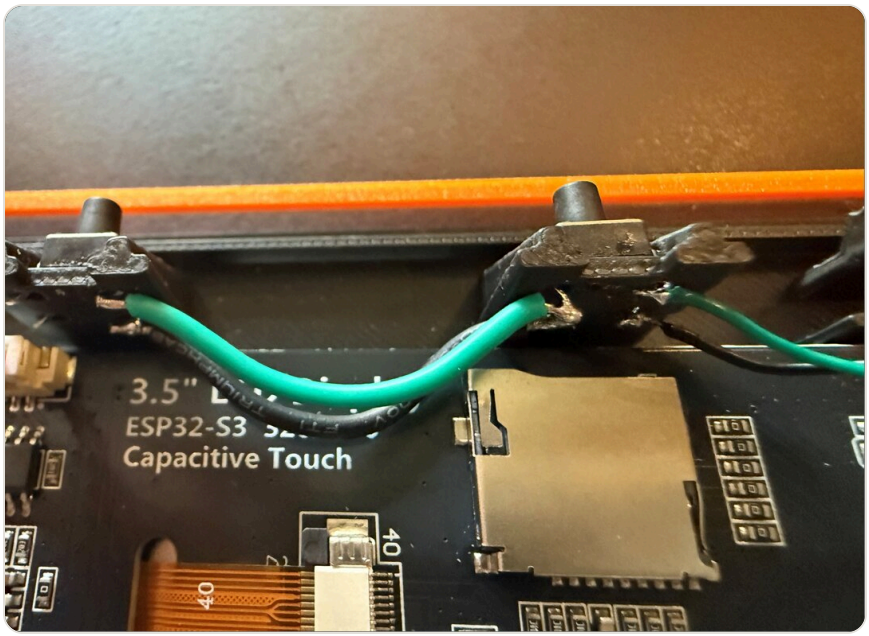
1. Push the two switches into the switch shelves on the inside of the bezel's top edge, button facing up, pins pointing left and right.
2. **Jumpers:** with two short pieces of wire, join the inner pins of the left switch to the matching inner pins of the right switch: top pin to top pin, bottom pin to bottom pin (the green wires in the diagram). The switches are now side by side (in parallel), so either one works the snooze.
3. **Board cable:** the boards come with a short cable with a plug (pigtail) for their small connectors. Cut it to length and solder its **snooze pin** wire and its **GND** wire to the two **outer** pins of the left switch, one wire to each pin. Clip the cable's other two wires (red and yellow) off right at the plug, so their ends can't touch anything.
4. Plug the cable into the board's connector (see the table). With the cables that come with the boards, the wires to use are the **green** and **black** ones: on the Freenove, green is **IO45** and black is **GND**; on the CYD, black is **IO32** and green is **GND**. If your cable's colors differ, match the wires to the pin labels printed next to the connector.

Board	Connector	Snooze pin	Ground
Freenove	4-pin connector labeled 3.3V / GND / IO46 / IO45	IO45	GND

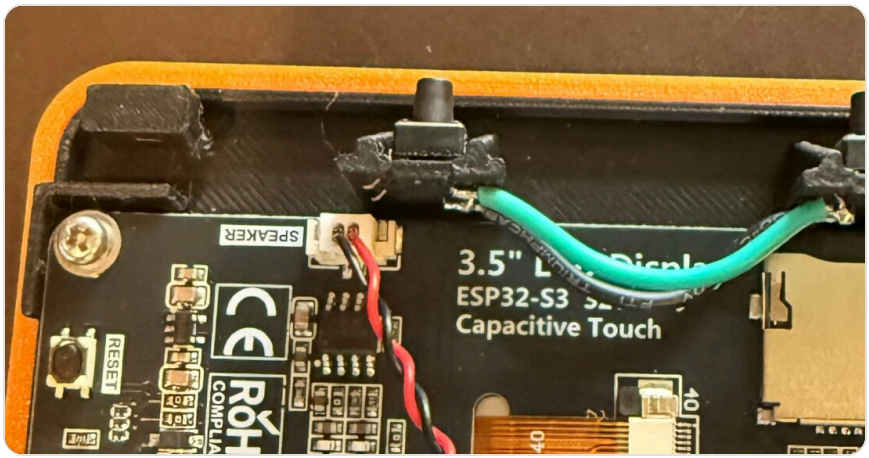
Board	Connector	Snooze pin	Ground
CYD	4-pin I2C connector labeled 3.3V / IO32 / IO25 / GND	IO32	GND



The snooze bar wiring

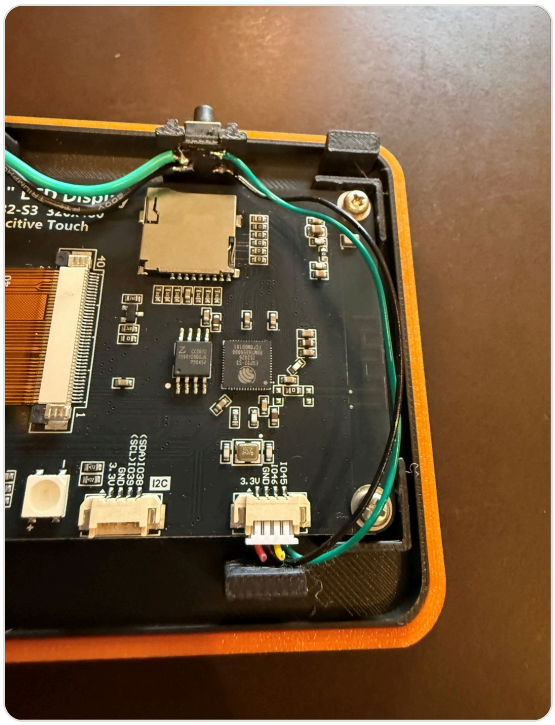


Two switches wired side by side

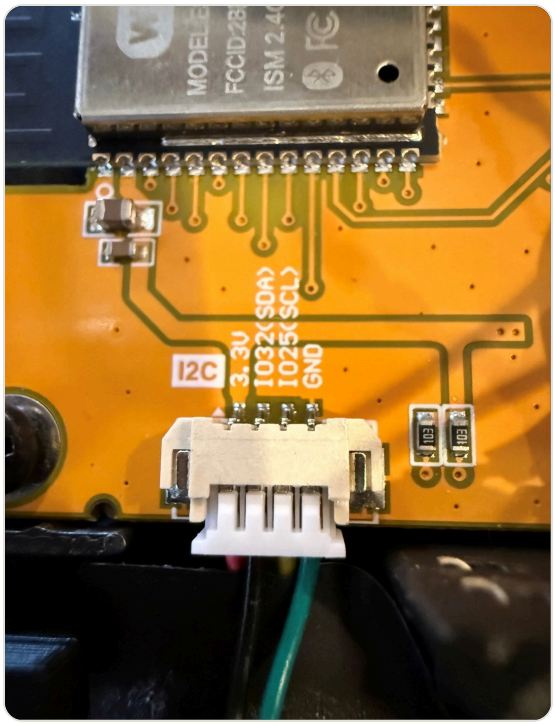


A switch in its shelf, and the speaker plug (Freenove)

It doesn’t matter which of the two cable wires goes to which outer pin. If the snooze bar doesn’t respond later, the clock’s web page shows when it sees a press (see Testing).



The Freenove: the cable’s green (IO45) and black (GND) wires run to the left switch; red and yellow are clipped off at the plug

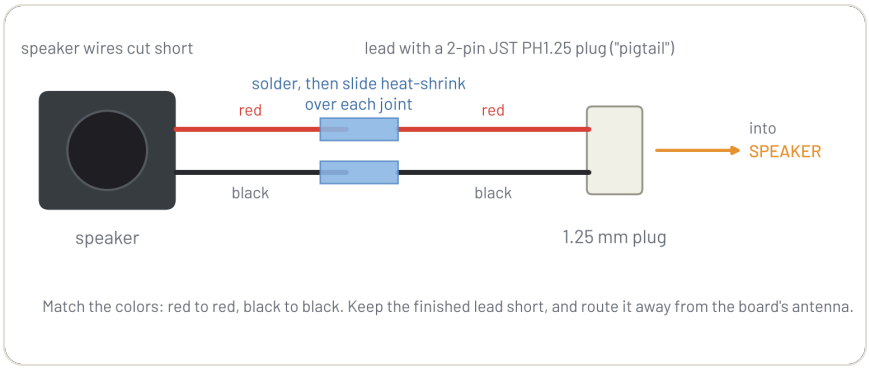


The CYD's I2C connector, with its pin labels: black (IO32) and green (GND) are used; red and yellow are clipped off at the plug

Speaker

The speaker's plug goes into the board's **SPEAKER** connector. It only fits one way.

The louder 4 Ω speaker comes with a larger 2.0 mm plug, which doesn't fit the board. Replace it with a 1.25 mm lead:



Splicing a 1.25 mm lead onto the 4 Ω speaker

1. Cut the speaker's plug off, leaving its wires about 3 cm (1¼") long. Cut the new lead to a similar length.
2. Strip about 5 mm from each wire end, and slide a piece of heat-shrink onto one wire of each pair.

3. Twist red to red and black to black, and solder each joint.
4. Slide the heat-shrink over each joint and shrink it with a heat gun or lighter.
5. Plug the new lead into **SPEAKER**.



The finished splice: heat-shrink over both joints, and the new 1.25 mm plug ready for SPEAKER

If you'd rather not cut the speaker's wires, a short adapter cable (2.0 mm socket to 1.25 mm plug) also works; tie up the extra length and keep it away from the antenna (see the tip below).

> **Keep wires short and away from the antenna.** Long speaker or battery wires near the board's antenna (at the end of the metal ESP32 module) can weaken the WiFi enough to cause dropouts. Cut leads to length, and route them along the side of the case, away from that end of the board.

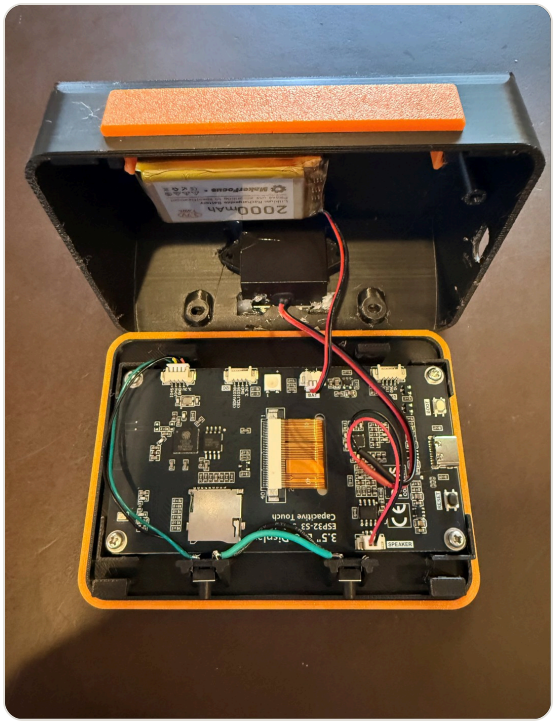
Battery

The battery keeps the clock running through a power outage; the board charges it from USB. On the CYD, a 1100 mAh battery runs the clock for about 7½ hours, and a 2000 mAh one about twice as long. Other boards may draw a little more. The clock limits its brightness on battery to make it last (see the Operating Manual).

Check the polarity before plugging in the battery. Small batteries with 1.25 mm plugs don't all use the same wiring. Look for the **+** and **–** marks printed next to the board's **BAT** connector: the battery's **red** wire must go to **+**. If it's the other way around, don't plug it in; swap the two wires in the plug (lift the tiny tab on the plug and slide each wire out) or use a different battery. Plugging a battery in backwards can damage the board.

Handle the battery gently: don't bend, puncture or crush it, and keep the bare plug pins away from metal.

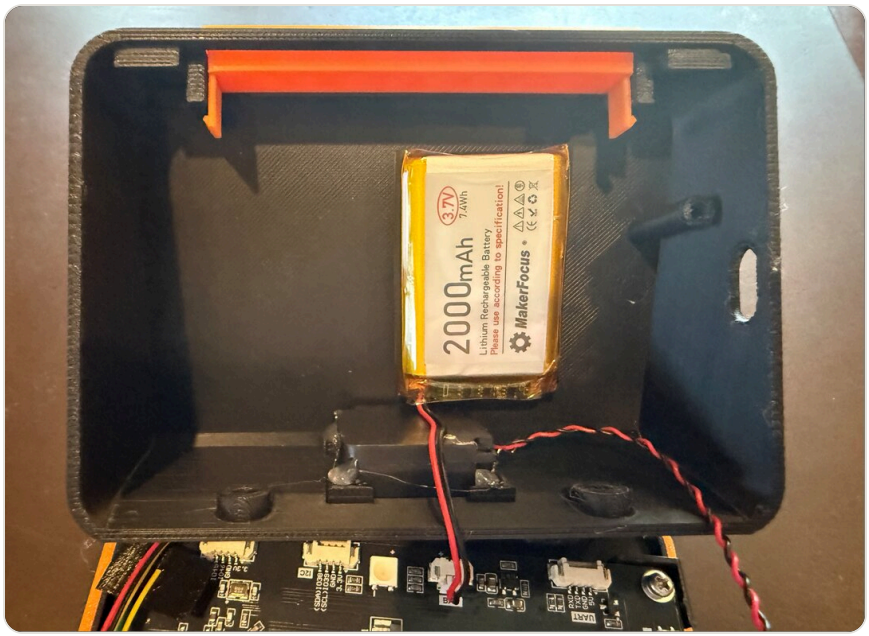
Assembly



Everything connected, ready to close (Freenove, with the louder 4 Ω speaker in the cradle)

1. **Board into the bezel.** Lay the bezel face down on a soft cloth. Set the board in it, screen down, with the USB port toward the side with the USB opening in the case. Screw it to the four posts with the **M2.5 × 6** screws. Snug, not tight; the screws hold the board in place.
2. **Snooze cable.** Plug the snooze cable into the board (see Wiring) and route it along the edge so it won't be pinched.
3. **Speaker.** Put a dot of hot glue in each inside corner of the speaker cradle, at the bottom and on the sides, **before** setting the speaker in; glue added afterward is hard to place and holds less well. Then set the speaker face down in its cradle on the base, over the grille holes, and press it down while the glue sets. The 4 Ω speaker is a little longer than the cradle: set it with its wire end toward the front, tilted up slightly at the back, and glue it the same way. Plug it into **SPEAKER**.
4. **Battery.** Stick the battery to the inside of the back wall with the foam tape, plug end toward the bottom. Check the polarity (above), then plug it into **BAT**.
5. **Snooze bar.** Push the snooze bar into the slot on top of the body from outside until its two hooks click under the catches inside.
6. **Band ring.** Lay the band ring over the bezel's lip.
7. **Close the case.** Hook the bezel's two top hooks behind the rails under the top of the body, then swing the bottom of the bezel in. Make sure no wire is caught between the parts.

8. **Screws.** Turn the clock over and drive the two **M3 × 8** self-tapping screws up through the holes in the base into the bezel. They cut their own thread: firm, but stop as soon as they're snug.
9. **Feet.** Stick the four bumper pads into the round dimples on the base.



The speaker in its cradle, the battery on the back wall and the snooze bar



The battery held by foam tape



The snooze bar’s hooks under the catches



Closing the case: top hooked in, bottom still swung out



The underside: two M3 screws, four bumper pads and the speaker grille

Installing the firmware

The first install goes over USB from a computer. After that, the clock updates itself from its own web page.

1. Plug the board into the computer with a USB-C **data** cable. The case can be closed already; the USB port is reachable from the side.
2. In **Chrome** or **Microsoft Edge**, open the Rouse web installer at **rouseclock.com/flasher**.
3. Click **Install** under your board, choose the board's port in the list, and click **Connect**. Then **Install**.
4. Wait for the progress to finish (about a minute). The board restarts and shows **WiFi setup**.

If it doesn't connect, the installer page lists what to try. The most common fixes: use a different (data) USB cable, or put the board in download mode by holding **BOOT**, pressing and releasing **RESET**, then releasing **BOOT**.

Prefer the command line? Each release also has a **FULL** firmware file for each board (for example *Rouse-1.0.0-Freenove35-FULL-flash-at-0x0.bin*), which any ESP32 flashing tool such as esptool can write at address 0x0.

First power-up

Setting up

Follow **First setup** in the Rouse Operating Manual: join the clock's **Rouse-** WiFi network with your phone, pick your home WiFi, then open **http://rouse.local**.

If the picture looks wrong, it's quick to fix in the web page under **Settings → Hardware**: **Invert colors** for a photo-negative look, **Swap red and blue** if red shows as blue, **Rotate display 180°** if it's upside down. On the CYD, touch calibration runs by itself the first time; tap each target as it appears.

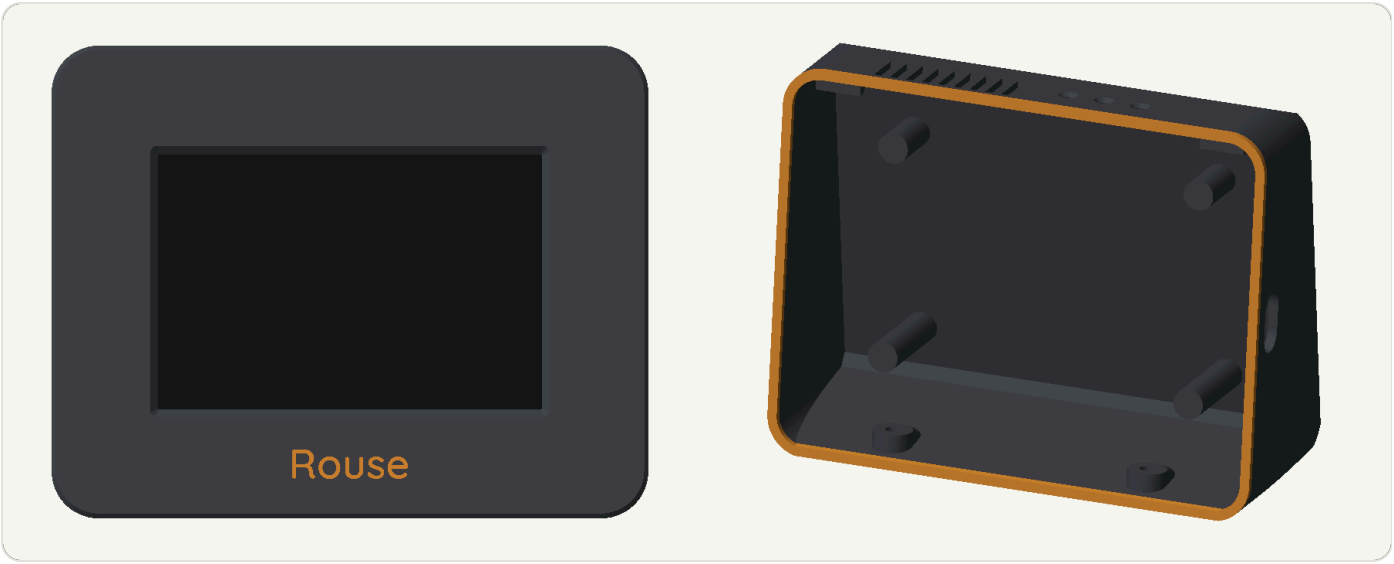
Testing

1. **Snooze bar.** In **Settings → Hardware**, turn on **Snooze button** (the pin is already correct for your board). Press the snooze bar: the line under the switch shows the press. Press each end of the bar; both should register.
2. **Sound.** In **Alarms**, add an alarm and tap **Ring it now (test)**. Snooze it with the bar, then hold the bar to stop it.
3. **Battery. Settings → Status** shows the battery level. Unplug USB for a few minutes: the clock keeps running.

Your Rouse is ready. Everything else is in the Operating Manual.

The Waveshare board

The Waveshare ESP32-S3-Touch-LCD-3.5-C comes in Waveshare's own enclosure, with its own speaker and touch screen. It doesn't need wiring: the whole enclosure goes into a Rouse case made for it, with the same look, window, band and 8° tilt as the other Rouse cases, just 6 mm taller.



The Waveshare version: the sound grille and the paperclip holes over the buttons on top, and the USB opening on the right

You need: the Waveshare board in its enclosure, the two **M3 × 8** self-tapping screws and the four bumper pads from the parts list. There's no snooze bar and nothing to wire: the board's motion sensor lets you **tap the case** to snooze (one tap) or stop the alarm (two quick taps). The touch screen's **Snooze** button works too.

Print plates 7–10 of the 3MF: the Waveshare case, one of the two Waveshare bezels (plate 8 with the inlaid name, or plate 9 with the name engraved), and the Waveshare band ring.

1. **Install the firmware** first (see Installing the firmware, choosing **Waveshare**). The USB port stays reachable later, but the enclosure's **BOOT** button will be inside the case.
2. **Enclosure into the bezel.** Lay the bezel face down on a soft cloth and press the enclosure into it, screen down, with its USB-C port on the side toward the case's USB opening. Small ribs on the bezel's inner walls keep it centered. When the case is closed, four posts inside the case press on the enclosure's rubber feet, so tapping the screen can't push it back.
3. **Band ring and closing.** Lay the band ring over the bezel's lip, hook the bezel's two top hooks behind the rails under the top of the case, and swing the bottom in.

4. **Screws and feet.** Drive the two M3 × 8 screws up through the base, and stick the bumper pads into the dimples.

5. **Test the tap.** Set an alarm a minute ahead (or use **Ring it now (test)** in the alarm editor). When it rings, tap the case once: it snoozes. Then tap twice quickly: the snooze is cancelled. Tap-to-snooze is on by default; its settings are in **Settings → Hardware** (see the Operating Manual, *Tapping the case*).

The enclosure's speaker, microSD slot and buttons are on its top edge, under the case's top. A **grille** in the top lets the sound out, and three small holes above the buttons let you press **PWR**, **RESET** and **BOOT** with a straightened paperclip. Seen from the front, the holes are, from the left: BOOT, RESET, PWR.



Rouse on the Waveshare board

A case for the bare Waveshare board (without Waveshare's enclosure, with a bigger speaker) may come in a future version.

Troubleshooting the build

The computer doesn’t see the board. Use a different USB-C cable (many only charge) and a different USB port. On Windows, the CYD may need the CH340 USB driver from the board maker.

The install stops with “Failed to connect”. Hold **BOOT**, press and release **RESET**, release **BOOT**, and try again. On the Freenove and Waveshare, a second try after reloading the page often works.

The screen stays dark after installing. Press **RESET** once, or unplug and replug the board.

No sound. Check the speaker plug is fully in the **SPEAKER** connector. Test with **Ring it now** at a high volume.

The snooze bar does nothing. Check that **Snooze button** is on in **Settings → Hardware** and the **Button pin** matches your wiring (IO45 on the Freenove, IO32 on the CYD), then watch the line under it while pressing. If no press shows: check the solder joints, and that the cable goes to the two pins on the **same side** of the left switch.

The snooze bar only works at one end. A jumper between the switches is loose or goes to the wrong pin; each jumper joins matching pins (top to top, bottom to bottom).

No battery level. Check the battery is plugged into **BAT** and the polarity is right. A completely empty battery may take a while to show up after charging starts.

The case won’t close. A wire is in the way, usually the battery or speaker lead at the bottom. Reroute it along the side wall.

The bezel is loose. Check both top hooks are behind the rails and both M3 screws are snug.

Still stuck? Email **support@tuscanygroup.com**. A copy of the clock’s log (**Settings → Diagnostics log → Copy log**) helps a lot.