

HOMEMADE · DIY KIT

DRINK CAPSULE

Keeps your can cold or hot. Assembly and user manual.



Version 1.1 · October 2026 · about 10 in tall · runs on 4 removable 18650 cells

Before you begin

⚠ Safety first

- **Never run the tile without the cooler and its fan.** It burns out in seconds.
- **Only heat drinks that aren't fizzy.** A heated soda can builds up pressure.
- **Treat the 4 cells as a set.** Charge them together, use them together, and never mix full and empty cells.
- Don't use cells with dents or torn wrappers. Don't leave them charging overnight.
- If anything smells hot, switch off and take the cells out.

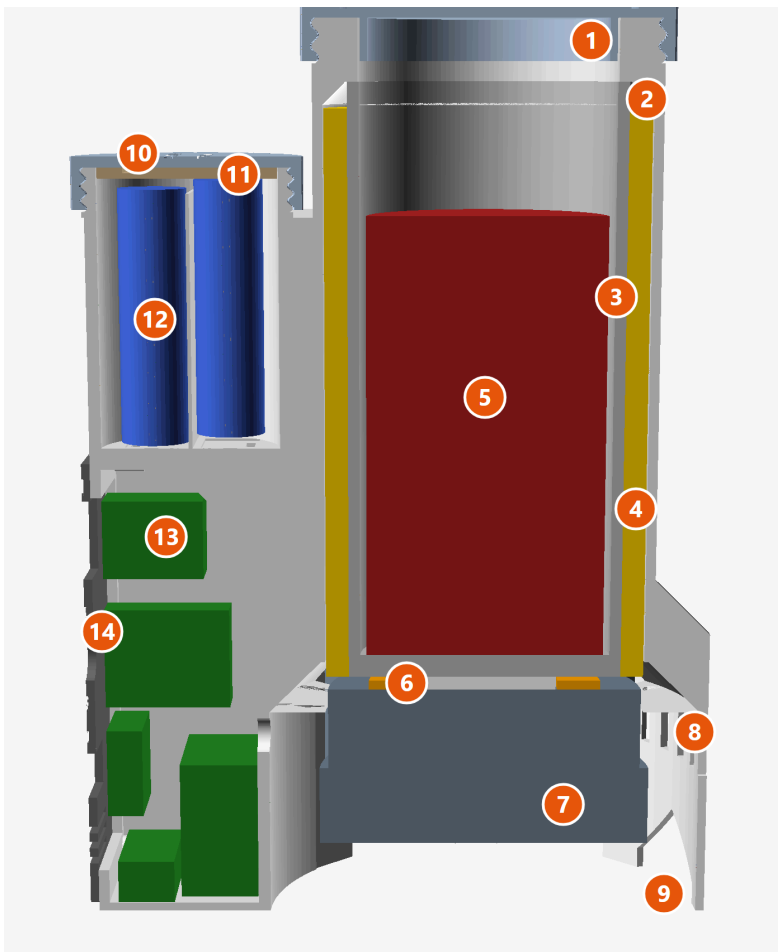
Wait for your parts before printing the body. Some sizes are best guesses until the real cooler, contacts and switches arrive. Send photos of them next to a ruler and the print file will be checked and adjusted. You can print the small test pieces (*2 - Test pieces (optional).3mf*) any time.

Tools you need

- Soldering iron + solder
- Wire stripper / cutter
- Small Phillips screwdriver
- Craft knife or scissors (foam)
- Hacksaw (only if your tube isn't cut to length)
- Lighter or heat gun (heat-shrink)
- Rubbing alcohol + paper towel

How it works

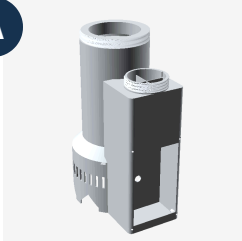
A Peltier tile is a thin heat pump. Power it one way and its top gets cold while its bottom gets hot; flip the power and it swaps. The tile sits under an aluminum cup, so the whole cup gets cold (or warm). A fan-cooled heatsink under the tile carries the waste heat away, and foam keeps the cup's cold in. The tile runs gently at about 5 V, which wastes far less power, so 4 cells last 1¼–1½ hours.



- 1.** Screw-on lid with a foam plug
- 2.** Ledge: the tube top pushes up against it
- 3.** Aluminum cup (3 in tube with a disc floor)
- 4.** Foam wrap, 1/4 in
- 5.** 12 oz can
- 6.** Peltier tile in its printed frame
- 7.** Cooler, upside down (fan at the bottom)
- 8.** Hot air out
- 9.** Air in between the feet
- 10.** Cell cap
- 11.** Carrier: links the cells on top
- 12.** 4 x 18650 cells (2S2P)
- 13.** Electronics bay: converters, gauge, switches
- 14.** Front panel

What's in the box: printed parts

A



Body (base, cup holder,
battery pod)

x 1

B



Lid

x 1

C



Cell cap

x 1

D



Front panel

x 1

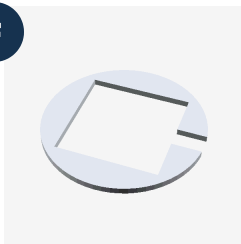
E



Cell carrier

x 1

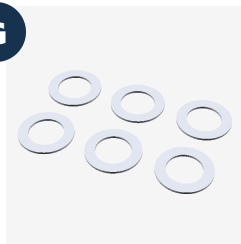
F



Tile frame

x 1

G



Key washers

x 6

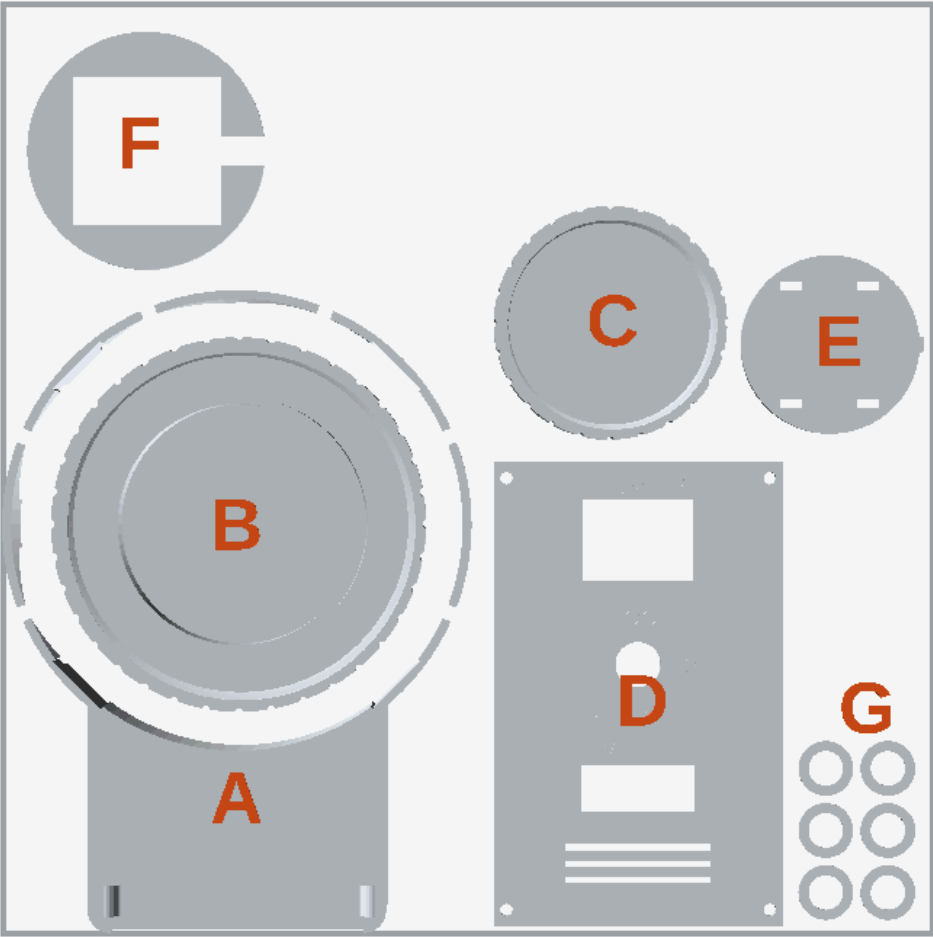
Print them all at once

File: 1 - *PRINT THIS - Drink Capsule.3mf*, every part on one X1C plate. The lid prints *inside* the hollow base and comes free when you lift the body off.

To open it: double-click it, or in Bambu Studio use File → Open Project. If Bambu Studio says the file isn't from Bambu Lab and only the geometry will be loaded, click **OK**. That's expected. Don't press Arrange, or the lid will be moved out of the base.

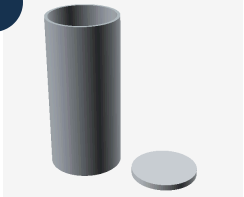
Settings: printer X1 Carbon · PETG · 0.20 mm layers · 4 walls · 5 top and bottom layers · 15% gyroid infill · **no supports** · brim on.

The body is 248 mm tall, just under Bambu Studio's 250 mm height limit for the X1C.



What's in the box: parts you buy

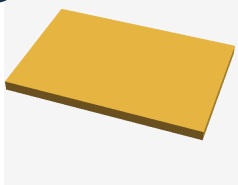
1



Aluminum tube 3 in ×
6.5 in + 2.75 in disc

× 1 + 1

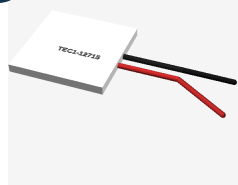
2



Closed-cell foam sheet,
1/4 in

× 1

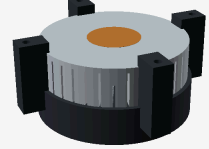
3



Peltier tile TEC1-12715
(you have it)

× 1

4



Intel round CPU cooler

× 1

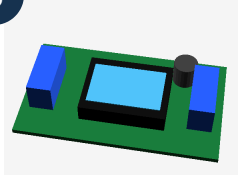
5



Protected 18650 cells

× 4

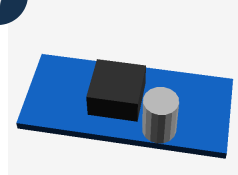
6



Step-down converter
with display

× 1

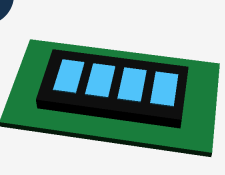
7



12 V booster

× 1

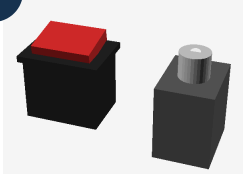
8



Battery gauge (2S)

× 1

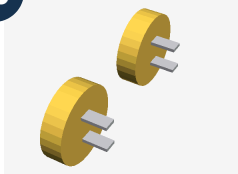
9



Rocker switch + DPDT
toggle switch

× 1 + 1

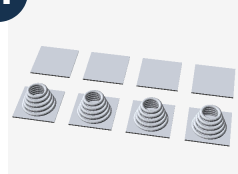
10



Safety discs KSD301, 60
°C

× 2

11



Cell contacts: springs +
flat plates

× 4 + 4

12



M4 × 35 screws + M4
nuts

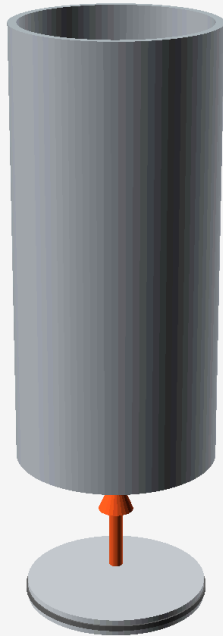
× 4 + 4

Also needed: inline fuse holder + 10 A fuse, 4 × M3 × 10 self-tapping screws, 16 AWG silicone wire (red + black), 6.3 mm spade connectors, heat-shrink tube, thermal paste, thermal epoxy (or J-B Weld), superglue, double-sided foam tape, a 4-bay 18650 charger.

The full shopping list with search terms is at the back.

Assembly

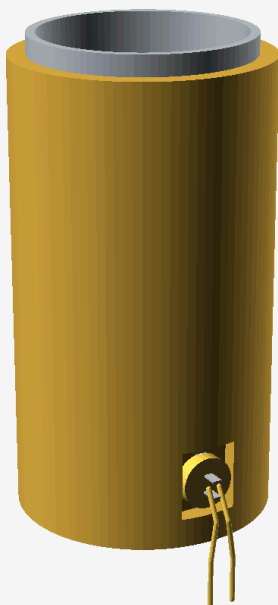
1 Glue the disc into the tube



1. Wipe the tube and the disc with rubbing alcohol.
2. Spread thermal epoxy around the edge of the disc.
3. Push the disc into one end of the tube until it is flush with the end.
4. Run a thin bead of epoxy around the inside joint so it's sealed. Let it cure for 24 hours.

TIP Disc too tight? Put it in the freezer for 30 minutes. It shrinks a little.

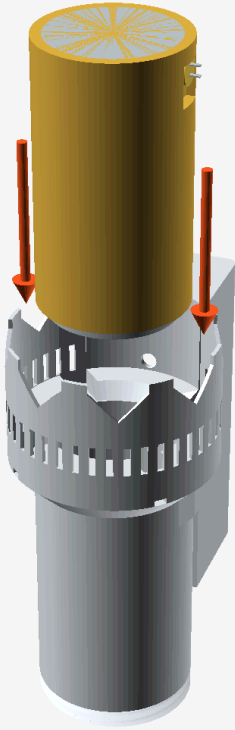
2 Wrap the foam and add safety disc 1



1. Wrap the foam around the tube. Start at the disc end and stop 1/4 in (7 mm) below the top.
2. Cut a window in the foam about 3/4 × 1 in, starting 1/2 in up from the bottom.
3. Bend the safety disc's two tabs flat and solder a 12 in (30 cm) wire to each.
4. Glue the disc's metal face onto the tube in the window with thermal epoxy. Run the wires down past the bottom.

3

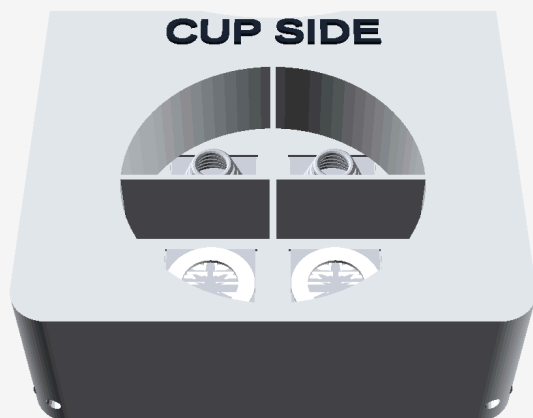
Slide the cup into the body



1. Turn the body (A) upside down.
2. Line safety disc 1 up with the bump on the side of the body.
3. Slide the cup in from the bottom, disc end last, until the top of the tube stops against the ledge inside.
4. Leave the safety-disc wires hanging out of the base.

4

Fit the cell contacts

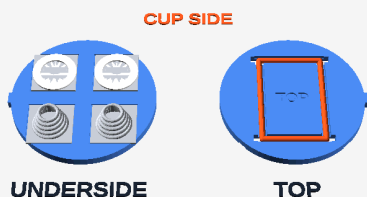


1. Solder a 6 in (15 cm) wire to each contact's tab.
2. Look down the cell tube. The 2 pockets on the **cup side** get **springs**. The 2 at the **front** get **flat plates**.
3. Push each tab and wire through its slot. Glue the contact flat in its pocket with a drop of superglue.
4. Glue a key washer (G) in the middle of each flat plate.
5. In the bay underneath: twist the 2 spring wires together. That's – (black). Twist the 2 plate wires together. That's + (red).

GOOD TO KNOW The key washer stops a backwards cell from touching, so a mistake does no harm.

5

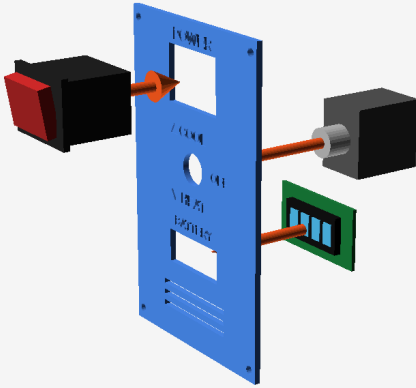
Fit the carrier contacts



1. Hold the carrier (E) with TOP facing up and its little tab pointing right. That's the way it sits in the tube when you face the front panel.
2. Underside: the 2 pockets nearer the cup get **flat plates + key washers**. The 2 nearer the front get **springs**.
3. Push the tabs through. On top, solder one wire loop that joins all 4 tabs. It sits in the groove.

6

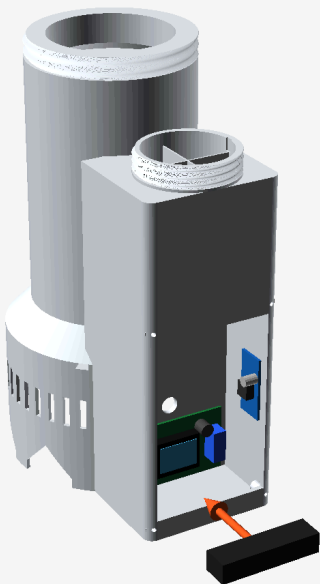
Fit the switches and gauge



1. Snap the rocker switch into the top hole of the front panel (D) from the front.
2. Push the toggle switch through the round hole from behind, then tighten its nut on the front. The lever moves up and down.
3. Fix the battery gauge behind the window with double-sided tape.

7

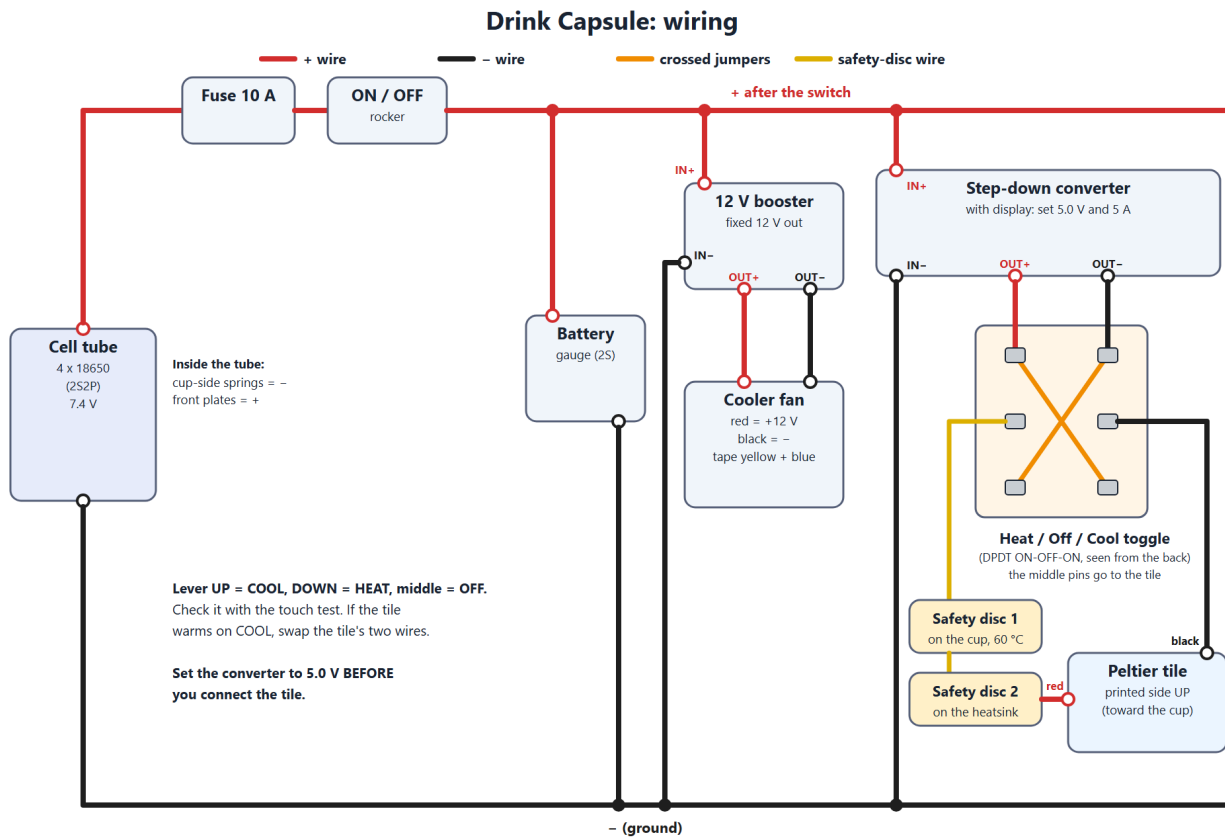
Put the electronics in the bay



1. Stick the step-down converter to the back wall of the bay with double-sided foam tape.
2. Stick the 12 V booster to the right-hand wall.
3. Lay the fuse holder on the floor of the bay.

8

Wire it up

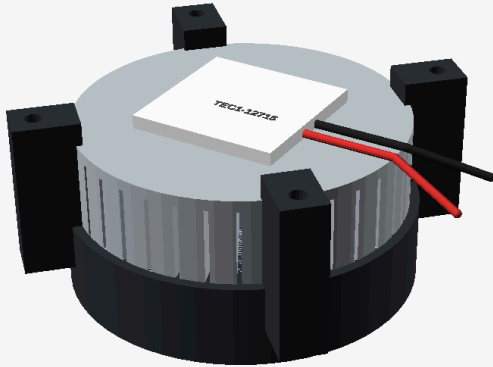


1. Pull the 4 push pins out of the cooler so its legs have plain holes.
2. Glue safety disc 2 to the side of the cooler's fins with thermal epoxy.
3. Feed the tile, fan and safety-disc wires through the hole at the back of the bay.
4. Solder everything exactly as in the picture. Put heat-shrink on every joint.
5. Fan: use only its red and black wires. Tape the other two.
6. Leave the tile's two wires **unconnected** for now.

CAUTION The two orange jumpers on the toggle switch cross over. That's what flips heat and cool.

9

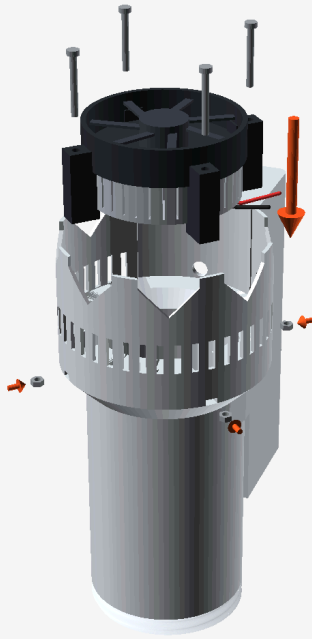
Set the converter and do the touch test



1. Put the cells in (step 12) and switch POWER on. The fan should spin.
2. Adjust the converter until its display shows **3.0 V**. If it has a current limit, set it to 5 A. Switch POWER off.
3. Put a dab of paste on the cooler's flat base. Set the tile on it, **printed side up**, and connect its two wires.
4. POWER on, toggle **UP** for 3 seconds, then touch the tile. It should feel **cold**. If it feels warm, swap the tile's two wires.
5. Switch off, set the converter to **5.0 V**, and take the cells out.

CAUTION Never run the tile without the cooler under it and the fan spinning. It burns out in seconds.

10 Fit the tile and the cooler



1. Turn the body upside down again.
2. Put the frame (F) around the tile on the cooler. The wires go out through the frame's notch.
3. Spread thin paste on the top of the tile.
4. Slide the 4 M4 nuts into the 4 slots in the base from the outside.
5. Lower the cooler into the base, fan facing out, until the tile meets the disc.
6. Put the 4 M4 screws through the legs into the nuts. Tighten in an X pattern, a little at a time, until **snug**.

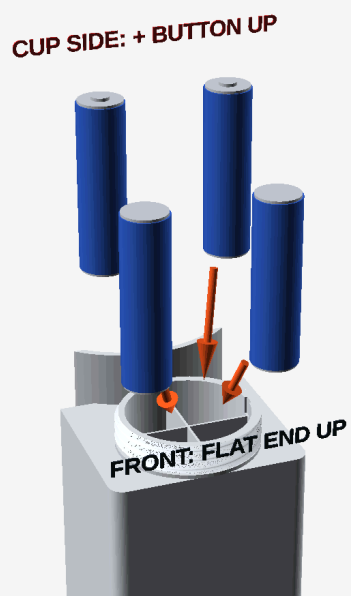
CAUTION Don't overtighten. The ceramic tile can crack.

11 Close the front panel



1. Tuck the wires into the bay.
2. Screw the front panel on with the 4 small M3 screws.

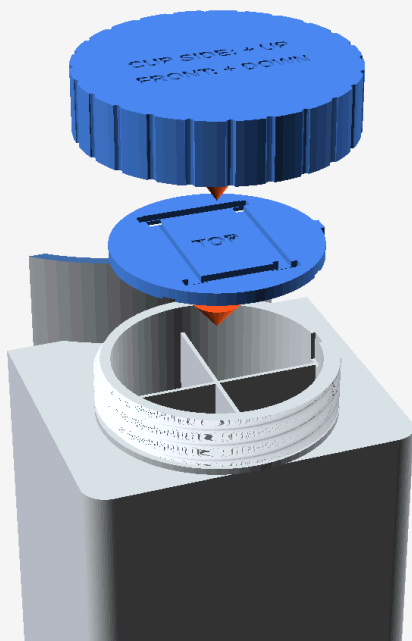
12 Load the cells



1. Unscrew the cell cap (C).
2. The 2 cells on the **cup side** go in with the + **button UP**.
3. The 2 cells at the **front** go in with the **flat end UP**.

TIP Always charge all 4 cells together and put all 4 back together.

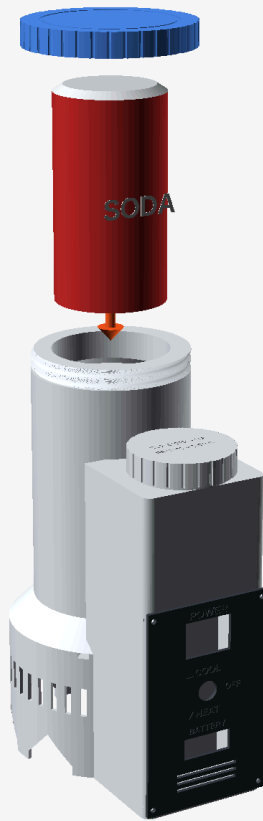
13 Fit the carrier and the cap



1. Drop the carrier (E) in, TOP up, with its tab in the groove.
2. Screw the cap on until it stops.

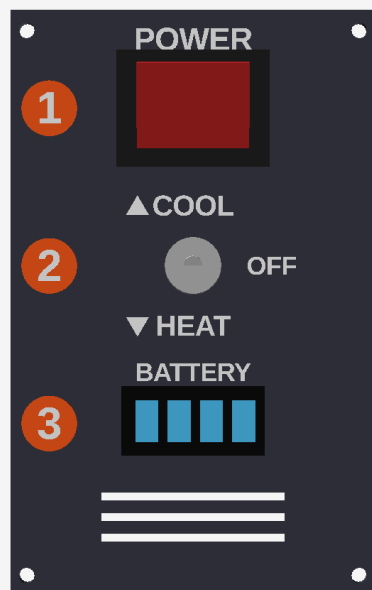
14

Add a drink and close the lid



1. Put a can in the cup.
2. Screw the lid (B) on.
3. You're ready. See **Using your Drink Capsule.**

Using your Drink Capsule



- 1 POWER switch.** Turns everything on: the fan, gauge and converter.
- 2 Mode lever.** UP = COOL, middle = OFF, DOWN = HEAT.
- 3 Battery gauge.** Charge the cells when it gets low.

Every time

1. Put a drink in. Start with a **cold** drink to keep it cold, or a **warm** one to keep it warm.
2. Screw the lid on.
3. Switch POWER on, then the lever to COOL or HEAT. You'll hear the fan.
4. When you're done: lever to the middle, then POWER off.

How long it runs: about **1¼–1½ hours** on 4 charged 3,500 mAh cells.

What to expect: it's best at *keeping* a drink cold or hot. It only nudges a room-temperature drink a few degrees. Heating works better than cooling.

Charging

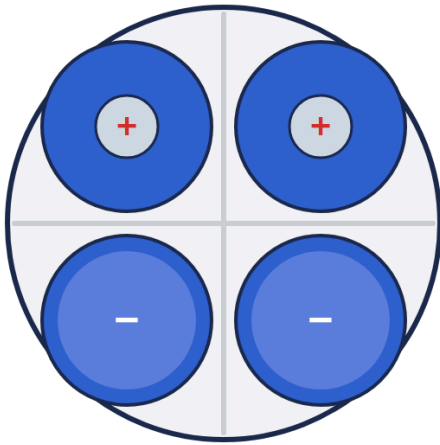
1. Unscrew the cell cap and lift out the carrier.
2. Take out all 4 cells and charge them together in the 4-bay charger.
3. Put all 4 back the right way round (cup side + UP, front + DOWN). Then the carrier, then the cap.

1. Look down into the cell tube

(cap and carrier off)



the drink cup is this way



Cup side: 2 cells with the + BUTTON UP

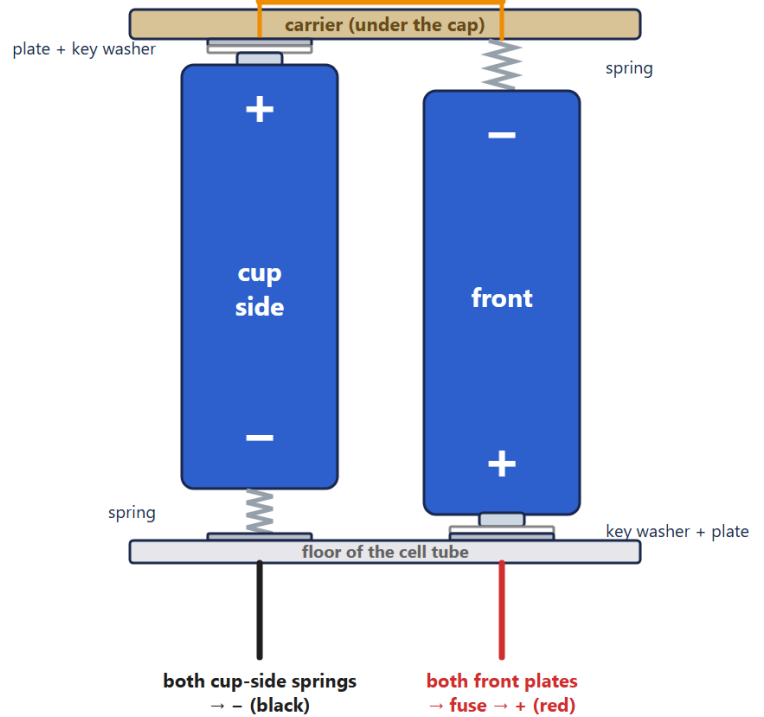
Front: 2 cells with the FLAT end up

A cell put in the wrong way just won't connect.
It does no harm. Flip it and try again.

2. How the contacts link them

(side view, cut in half)

one wire on top joins all 4 top contacts



Charge all 4 together and always put all 4 back together.

Troubleshooting

Problem	Try this
Nothing happens, the fan doesn't spin	Check the cells are the right way round and the cap is screwed down. Charge the cells. Check the 10 A fuse.
Fan spins, but no cooling or heating	Is the lever in the middle (OFF)? A safety disc may have cut out because something got too hot. Let it cool for 10 minutes. Check the tile's wires.
It gets warm on COOL	The tile's wires are swapped. Swap them, or just use the other lever position.
Cooling is weak	That's normal for a room-temperature drink: start with a cold one. Keep the lid on. Don't block the air gaps between the feet.
Runs for a short time	Charge all 4 cells fully, together. Old cells hold less.
Lid is stiff	Wipe the threads. Rub a little candle wax on them.

Specifications

Size	126 × 173 × 251 mm (5.0 × 6.8 × 9.9 in)
Holds	one 12 oz can (a 16 oz tall can just fits)
Cup	aluminum, 2.75 in across, foam-insulated, screw-on lid
Power	4 × protected 18650 cells, 2S2P, 7.4 V, about 50 Wh, removable
Heat pump	TEC1-12715 Peltier tile, run gently at 5 V
Run time	about 1¼–1½ hours
Safety	10 A fuse, two 60 °C cut-outs, protected cells, backwards-cell-proof contacts
Material	PETG (printed on a Bambu Lab X1C)

Shopping list

About \$200–230 in total, or \$130–160 if you already have cells and a charger.

Item	Search for	Cost
4 protected button-top 18650 cells, about 3,500 mAh, all the same model Buy from a battery shop (18650BatteryStore, IMR Batteries, Liion Wholesale), not random Amazon sellers.	protected 18650 3500mAh button top	\$40
4-bay 18650 charger Skip if you have one. Must fit 70 mm cells.	XTAR VC4SL or Nitecore SC4	\$30
Intel stock CPU cooler (round, aluminum, 12 V fan)	Intel E97379 cooler LGA1155	\$10
Step-down converter with a voltage/amp display Must work from about 6 V in and give 5 A or more.	buck converter CC CV 5A LCD display	\$15-20
Step-up converter, fixed 12 V out, 1 A	boost converter fixed 12V output 1A module	\$6
2S lithium battery level gauge	2S lithium battery capacity indicator	\$5
DPDT ON-OFF-ON toggle switch, 15 A, 6 pins 1/2 in mounting hole.	DPDT ON-OFF-ON toggle switch 15A	\$7
Rocker switch, 2 pins, about 16 A, 30 × 22 mm	KCD4 rocker switch 2 pin 16A	\$6
Inline blade fuse holder + 10 A fuse	inline blade fuse holder 16 AWG	\$6
2 × KSD301 safety discs, 60 °C, normally closed	KSD301 60C normally closed	\$8
18650 contacts: 4 springs + 4 flat plates	18650 battery spring contact plate nickel	\$8
16 AWG silicone wire, 6.3 mm female spade connectors, heat-shrink	16 AWG silicone wire, 6.3mm insulated female spade	\$15
Thermal paste + thermal epoxy (or J-B Weld)	Arctic MX-4, Arctic Silver thermal adhesive	\$15
Aluminum tube 3 in OD × 1/8 in wall × 6.5 in OnlineMetals / Metals Depot cut it to length.	6061 aluminum round tube 3 OD 0.125 wall	\$15-20

Aluminum disc 2.75 in × 1/4 in	6061 aluminum round bar 2-3/4 cut 1/4 inch	\$10-15
1/4 in adhesive closed-cell foam sheet	1/4 inch adhesive closed cell foam sheet	\$10
4 × M4 × 35 screws, 4 M4 nuts, 4 × M3 × 10 self-tapping screws	M4 x 35, M3 x 10 self tapping	\$6