

Background:

Time Machine + powerbank + powered speaker

I had the idea, last year, when I decided *not* to take my RPi4-based Time Machine on holiday. I did a couple of trials running it with a power-bank and a powered speaker. These were quite bulky together, and took away some of the fun of using the device - **too many wires**.

Basic Idea:

Put everything in a box

I decided to fit everything into an old cigar box, and thought that I would still use an ordinary powerbank and a powered speaker. However, I wanted it work like a laptop - running from external power, but carrying on when unplugged, without a reboot. A lot of powerbanks warn against this, and finding a suitable one with "pass-through" charging was surprisingly difficult, because most manufacturers don't make their specifications that clear.

So, I decided to get out the soldering iron and install a proper UPS circuit. I mentioned the idea to Steve and he told me that the new version of the Time Machine had much lower power consumption, and it really does - there's no comparison - this will run for hours on end, with a modest set of batteries.

The ingredients (links to UK vendors below) are:

- 1 x cigar box
- 1 x Time Machine Micro
- 1 x UPS module, to allow seamless switching between external and battery power
- 2 x 21700 batteries (nearly 10,000mAh in total)
- 1 x single board amplifier, with volume control
- 2 x 2-inch speakers, retrieved from a broken bluetooth speaker
- cables:
 - surface mount USB-C female to USB-C male (to power the UPS)
 - USB-A to 2 x USB-C (to power the Time Machine and the amplifier)
 - 3.5mm stereo jack to 3.5mm stereo jack (headphone out to amplifier in)
 - unterminated speaker cables (soldered to speakers, screwed into amplifier)

The new Time Machine is designed for a metal case and it is tricky to fit the controls in. In the end, I actually cut out a rectangle for the whole device, and then papered over the lid and device, so it looks like the controls are coming through the lid. I glued the Time Machine and the rest of the lid together, with a little block on the side of the Time-Machine. I couldn't find a block of wood, so I used a rectangular metal USB converter plug, which you can just see in the photos. I say this not as a recommendation, but just in case anyone spotted it and wondered

what it was.



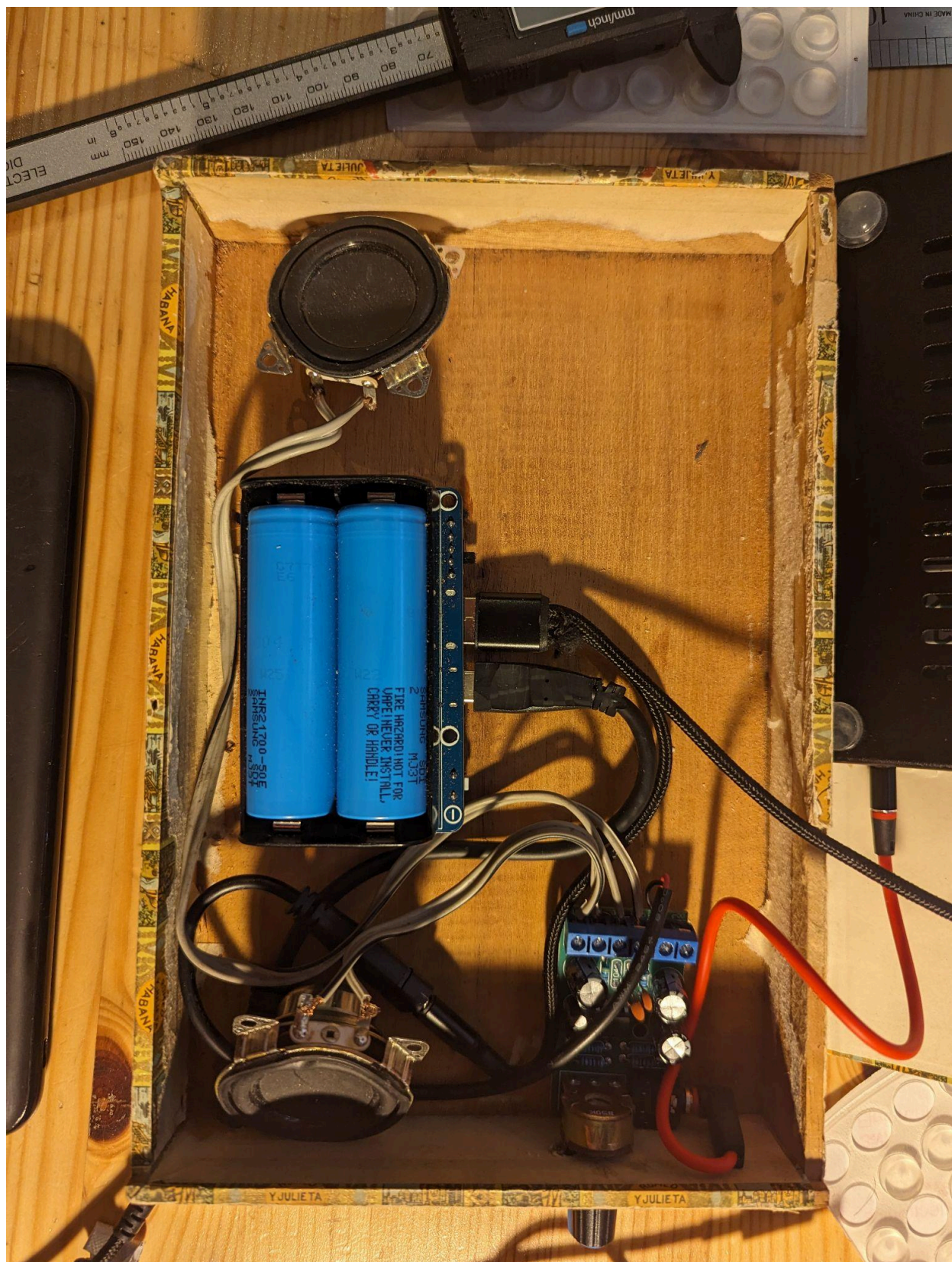
Design

Once I decided not to fit the controls through the lid, the layout was very serendipitous. The UPS and batteries fit right between the two speakers, and the speakers fitted snugly into the holes I drilled. So it's basically in two parts plus cables. The cables have to stay out of the way, which involved trimming some plastic from some of the plugs. However, a deeper cigar-box would make this unnecessary. Measured mine up with the Time Machine and the speakers and didn't think about the plugs until it was too late.

1. LID
 - a. Time Machine (top left)
 - b. Speakers (bottom left and right)
2. BOX
 - a. UPS + Batteries (bottom centre - so that the speakers fit either side, when lid is on)
 - b. Amplifier board (top right, with volume control poking through a hole on right hand side)
 - c. Surface mounting USB-C power socket (bottom right)
3. CABLES
 - a. old speaker wire from amp to speakers
 - b. Surface-mount USB-C female to USB-C male (into UPS)
 - c. USB-A male to 2 x USB-C male splitter
 - i. One plug straight into the Time Machine power socket
 - ii. One plug into another lead [3d]
 - d. USB-C female to +ve and -ve power cables, screwed into amplifier
 - e. 3.5mm to 3.5mm Time Machine to amplifier (smallest plugs I could find)
4. UNFINISHED IDEAS (might need a bigger box)
 - a. Power switch to switch off amplifier
 - b. Power switch to switch off Time Machine
 - c. headphone socket
 - d. aux input
 - e. better quality amp and speakers

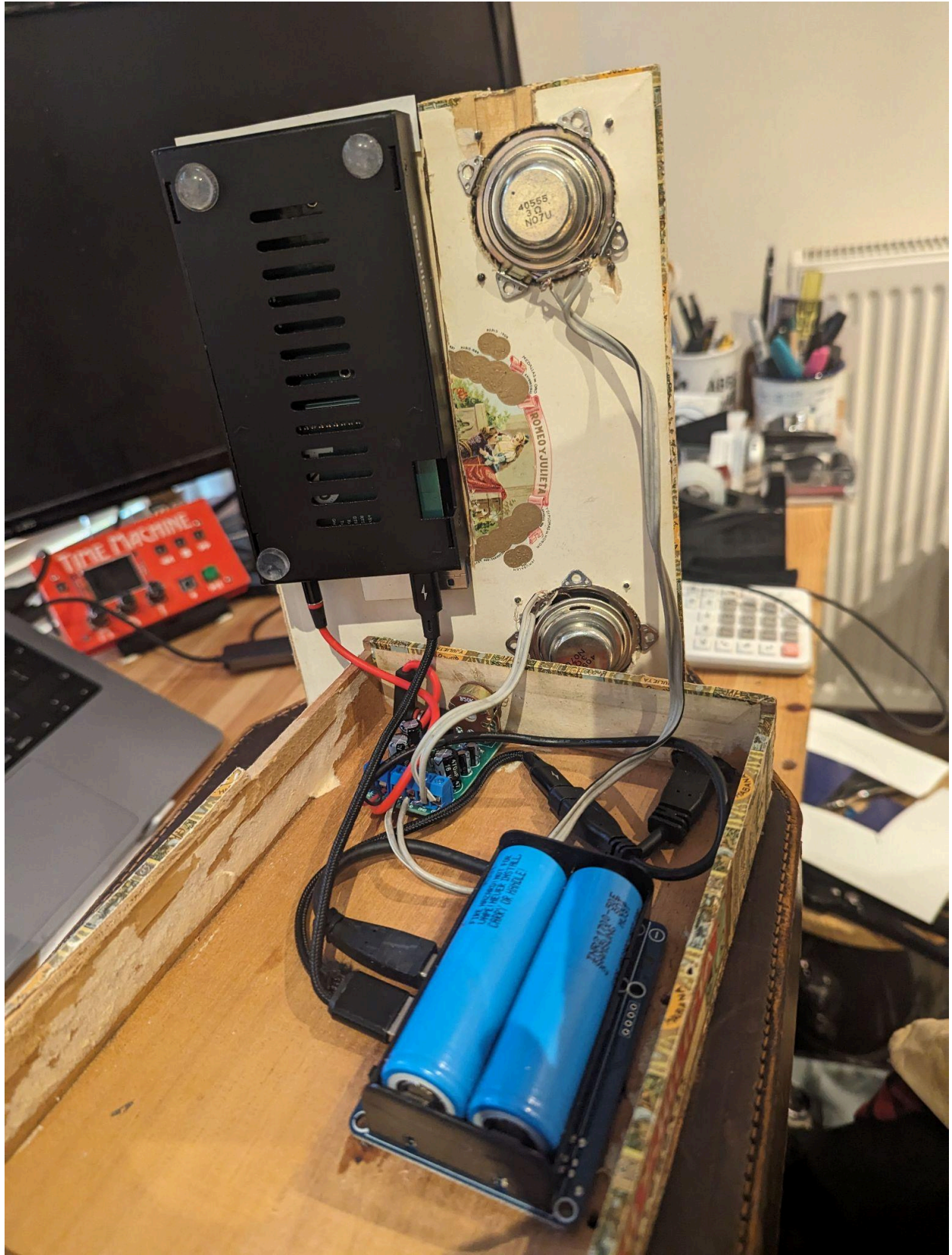
5. RESKINNING (unfinished)
 - a. Original box was a 1970s Romeo y Julieta box
 - b. I used scans of a similar box printed on photo paper to fix parts which I ruined.
See across the top of the front above the Time Machine
 - c. Garcia Mystery brand cigar box label
 - i. found online and printed with photo-paper
 - ii. there are other Garcia labels around, to suit every taste
 - d. Switch labels - designed by me. I'll include the file, but I'm sure you can do better:)

Gallery

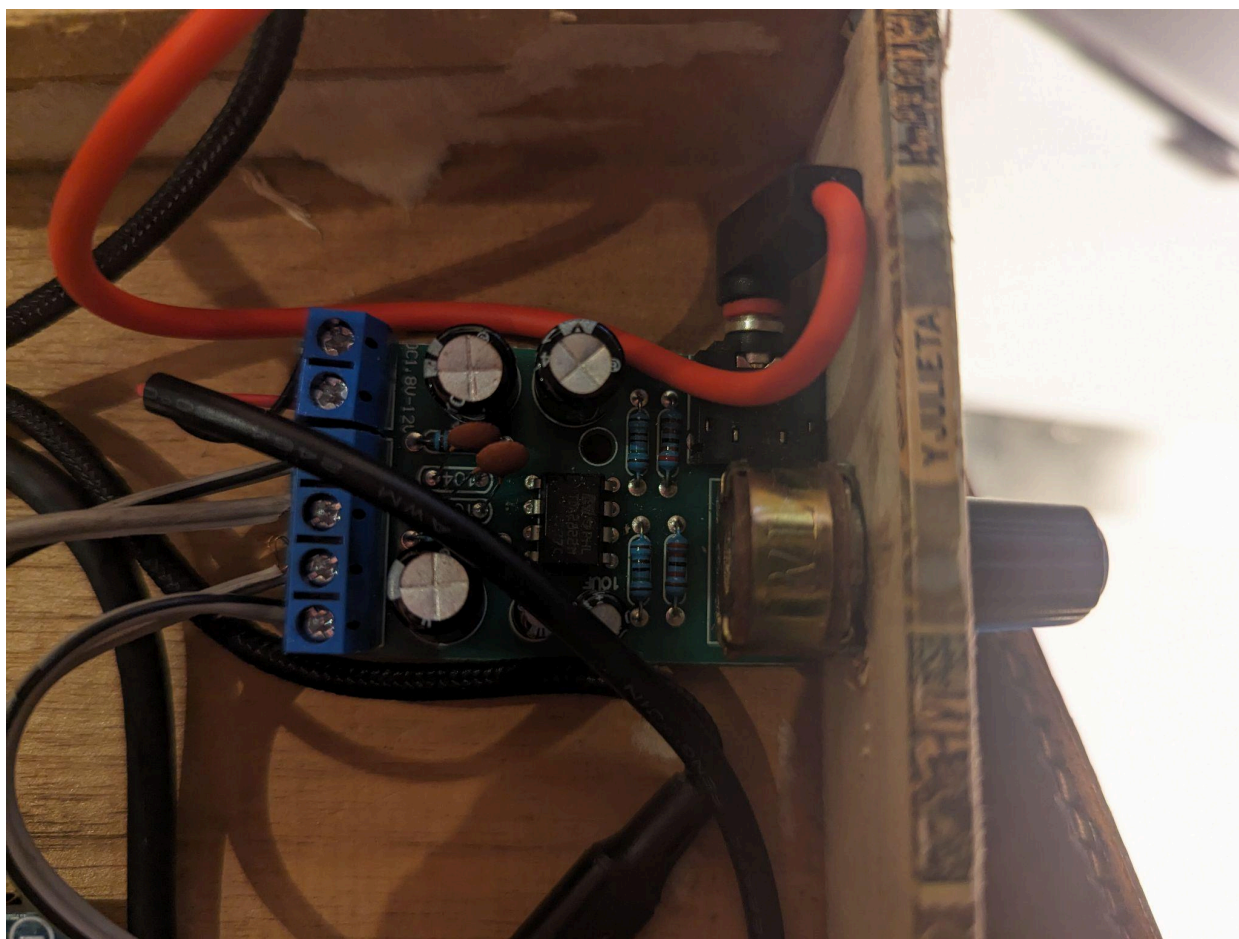














Actual Components Used

These are from UK stores. I'm sure similar things are available elsewhere:

UPS

<https://www.amazon.co.uk/exec/obidos/ASIN/B0CHJSQS3P>

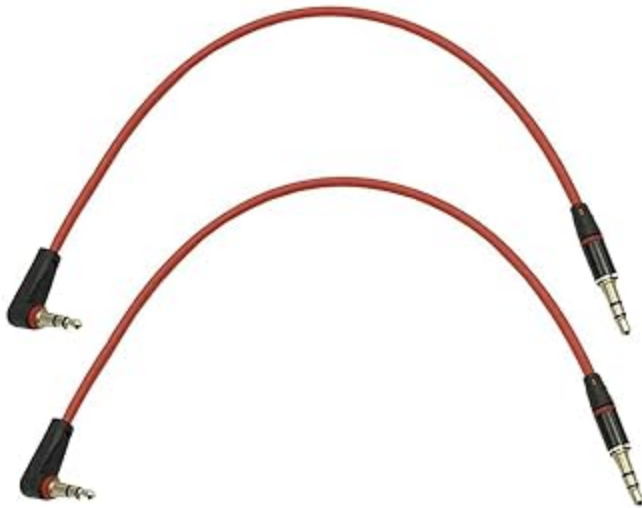
Waveshare UPS HAT (D) for Raspberry Pi, Supports 21700



Stereo Connector from Time Machine to Amplifier

https://www.amazon.co.uk/dp/B089K9YTQP?psc=1&ref=ppx_yo2ov_dt_b_product_details

LiKuCo 2Pack Short 8inch Right Angle 3.5mm Male to Male Aux Audio Cable/Aux Cord For Headphone, Car Audio Jack, Stereo Speaker, MusicPlayer with Gold Plated



Drill bit for 2-inch speakers

https://www.amazon.co.uk/dp/B0BVG5863?psc=1&ref=ppx_yo2ov_dt_b_product_details

45mm Hole Saws Cutter, HSS Bi-Metal Drill Bit for Wood, Plastic, UPVC, Fiberglass and Plasterboard



Power connection from USB-C Splitter to Amplifier

https://www.amazon.co.uk/dp/B0CWNT6CXP?psc=1&ref=ppx_yo2ov_dt_b_product_details

USB Type-C Power Cable to 2 Pin Bare Wire

6pcs



Amplifier

https://www.amazon.co.uk/dp/B075V7LG1T?psc=1&ref=ppx_yo2ov_dt_b_product_details

DC1.8-12V TDA2822M Amplifier 2 Channels Stereo 3.5mm AUX Audio Amp Board Module



USB-C Power input connector to UPS module

https://www.amazon.co.uk/dp/B075R7QBQD?ref=ppx_yo2ov_dt_b_product_details&th=1

USB 3.1 Type-C with Screw Hole Panel Mount Male to Female Data Extension Cable



NOTE - I wouldn't choose this again. It worked, but only because I glued it in. It is actually designed to screw to a metal PC slot cover, not go through a wooden box. The metal USB socket sticks out about 1mm from the plastic. I cut down the metal PC blank which came with it, drilled a big enough hole for the plastic socket glued the metal plate to the box. See image:





Speaker Covers

https://www.amazon.co.uk/dp/B07N2JGFTD?ref=ppx_yo2ov_dt_b_product_details&th=1

Bewinner 2 Inch Speaker Cover, Speaker Decorative Steel Mesh Circle Car Speaker Protective Mesh Cover Provide Protection for Speakers Car Speakers Outdoor(black)



