

# Hardware mods

*C64U owners who change their device to change it and expand or modify its functions on the hardware level*

## Extra function buttons

Several people have added buttons to their C64U. They add (typically) a dedicated button for **Menu**, **Freeze** and **Reset**. These are listings of how different people have done that in several ways.

### Membrane Switch buttons (Gavin H.)

- [Post about this on Facebook with video of result](#)
- Using the 3 button header for Reset, Menu and Freeze. To the left of the black FPGA board, there's a number of pinheaders. If you look in the manual, on the page 208/209, you can see one of them marked as item number 16 "utility buttons".
- **Parts list**
  - [OTOTEC 3Pcs 3 Key Membrane Switch \(Amazon UK\)](#)
    - the buttons. Look for 'membrane buttons'
    - [ELEGOO Dupont cable extensions \(Amazon UK\)](#)
      - DuPont extension (male to female)
      - You need cable extensions to reach the headers and get outside the case

### Right side buttons with 3D printer bracket (Jay W.)

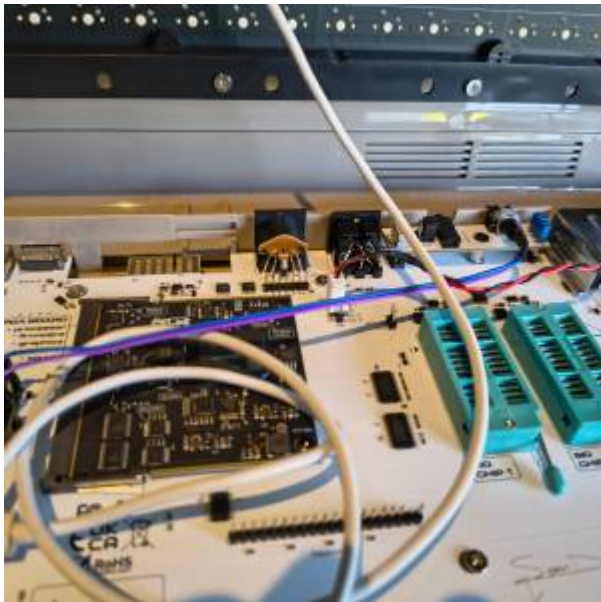
- [Post about this on Facebook](#)
- This is a mod that will add the Menu / Freeze / Reset button to the side of your Commodore 64 Ultimate. It uses a custom 3D printer side bracket so that the original is not changed.
  - [Info 3D model of the bracket used](#)
- **Parts list:**
  - [Momentary Push Button, SPST Normal Open ON/Off 2 Pin Round Button for Model Railway Hobby](#)
  - You will also need [JST connector](#) for the header pin on the motherboard. Just route the wires around how you wish.



## Reset button in the back using H-L port (Dean W.)

- [Post about this on Facebook](#)
- Another RESET button mod ☐ I just wanted a simple reset button, so I created a 3D printed support to go in the empty H-L hole in the case back to hold a small momentary switch (could set it to be a freeze or menu button too). - Note that the button may have to sit on a slight downward angle so as not to interfere with the top part of the case when closed. Just needs to be wired up to the GROUND and RIGHT pins on the "Button" header pins on the PCB.
  - <https://www.thingiverse.com/thing:7269213> 3D-print file





## Power light modification

### Dual color power/drive LED (Frank P.)

- [Post about this on Facebook](#)
- It is possible to replace the standard red power LED (basic beige edition) with a **dual color LED**. The C64U LED LIGHTNING menu has several options for the behaviour of the Power LED, like showing drive activity. The C64U board has 4 pins for the Power LED: LED 1, Ground, LED 2 and LED 3. In the default configuration it has a jumper cable with only two wires connected to the LED 1 and Ground pins. The current firmware only supports LED 1 & 2 at this time. You can choose several options for Output 1 & 2 in the menu.
- Ready made dual color power LED's are available online, like in these shops below.
  - [Corei64 dual round LED for the breadbin style case](#)
  - [Corei64 dual rectangular LED for the 64C case](#)
  - [Retroleum C64 LEDs](#)
- Or make them yourself. It's pretty easy, a little bit of soldering experience is enough.
- Parts list:
  - dual color LED or a RGB LED
  - Optional: Some resistors if you want the light to be less bright. For reference, 2.2k Ohm for green. And 220 Ohm for red and blue. If you want it even less bright, then use something like 1.5k for red and 1k for blue.
  - 3 wire cable with a DuPont connector, about 30 cm in length.
  - The longest leg on the LED is ground. The other ones are the colors.





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