# SB2040 is a gift that keeps on giving

Let's assume you managed to flash the SB-2040 board. Maybe it worked out of the box, or maybe you had to succumb to the way outlined here

SB2040 and the curious case of disappearing firmware

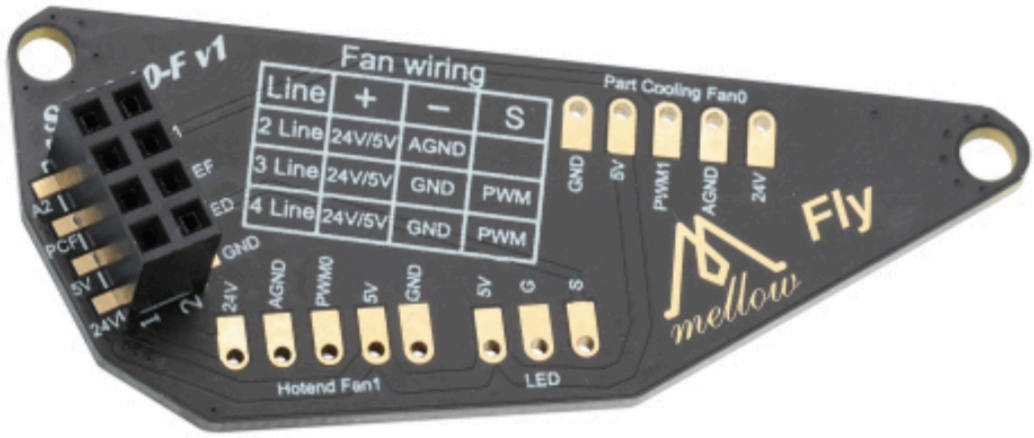
That doesn't mean you're done. There are still a few additional quirks that you should be aware of.

Thanks to: mallcop, DankNeutrino, Derpimus, 🍌Kyleisah, ZoZo

## Invalid GitHub docs link

Link to docs on GitHub is invalid, use this one https://mellow.klipper.cn/#/board/fly_sb2040/

## AGNDs are not what they seem 🦉




If you look at the fan wiring table, it says you should connect a 2-pin fan between AGND and 24V (or AGND and 5V). That sounds confusing, because somewhere deep down you would wish to regulate the fans, so you might tend to use the PWM pin. But no. AGND is a very vague marking and actually means it's a switched ground (i.e. controllable via a pin).

I didn't quite experiment with the PWM signal – three-pin fans are typically(?) fans with tacho and PWM fans have four pins (power, ground, tacho, and PWM). So you might not be able to use the tacho pin if you will be using a 4-pin fan. Or perhaps you could use also AGND? Not sure.

The Mellow docs do not help much with mapping between the numerical indices and the fan function, so this is a table for completeness

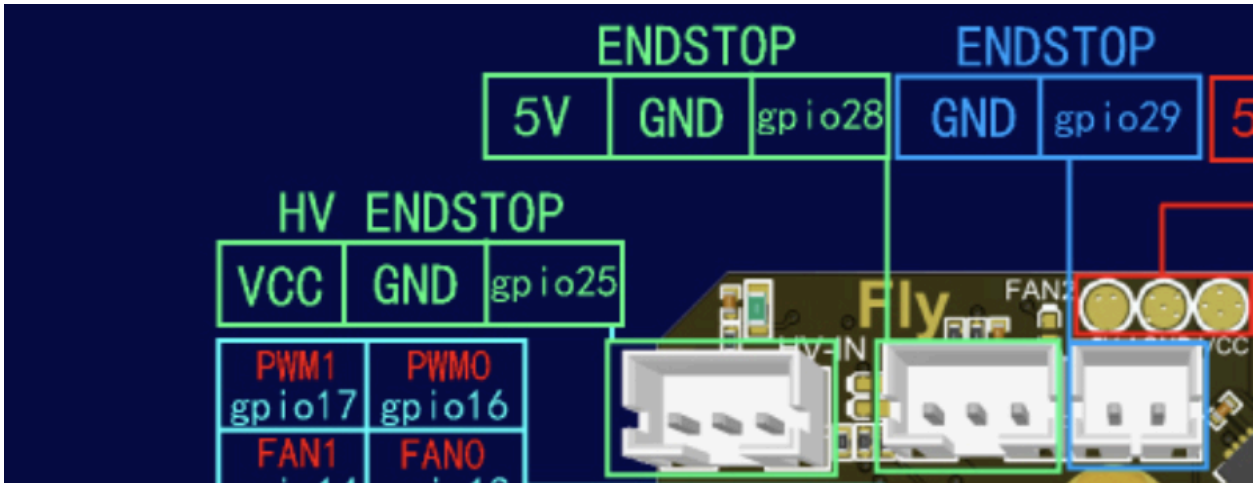
| **Human name** | **"Function"** | **AGND** |
|---|---|---|
| Hotend fan | Fan 0 | gpio13 |

| | | |
|---|---|---|
| Part cooling fan | Fan 1 | gpio14 |
| AUX fan | Fan 2 | gpio15 |

If you make a mistake during soldering, luckily the pins are easily swappable in the Klipper config.

## Endstops to keep you entertained

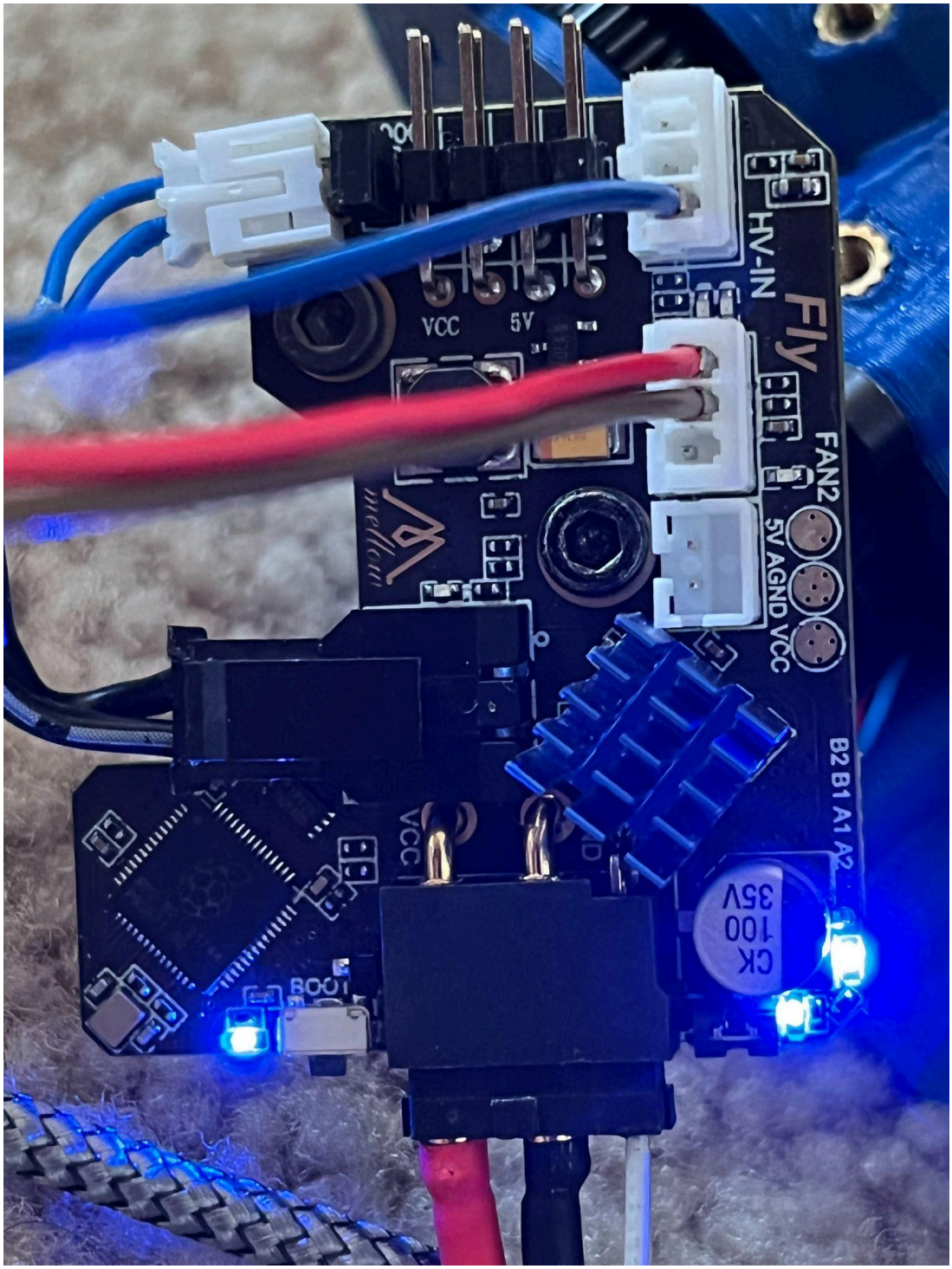
The board has three endstop slots.




For the purpose of this write-up, let's call it HV ENDSTOP, 5V ENDSTOP, and GND ENDSTOP.

- HV ENDSTOP seems to behave very politely and as expected. It has a diode on Signal(gpio25) pin, so you might be able to connect your 24V Euclid or your inductive probe (do you still remember them?) without even using the diode. There is also a blue led next to the HV endstop but I didn't see it doing anything, yet.
- GND ENDSTOP is also not very problematic – use that one for your X endstop or any other purpose (klicky)
- 5V ENDSTOP can be used for klicky or X endstop and as long as you won't be using the 5V, there will be no surprises. But if you use the 5V-pin, you should make sure your probe still outputs logic levels (3.3V) on the signal pin (gpio28). The MCU is not 5V tolerant and the board does not contain any circuitry to prevent you from putting 5V on the signal pin. So for example 5V Euclid might be causing problems — one of the indications is that the temperatures reported by the board stop making sense (often will become negative). See the next section.
  There are two ways that could be followed to prevent it. First, include a bat85 diode in the reverse direction to the Signal wire of your probe (similar setup as used for inductive probes. Do not forget to set up the probe with pull-up in the Klipper config).
  Or, if available and not used by other endstop, use the 24V endstop's signal pin, as shown on the pic – here, the probe will be configured with pull up on pin gpio25 in the

Klipper config.:



## Negative temperatures

| | Name | State | Current | Target |
|---|---|---|---|---|
| | Extruder | off | 37.3°C | 0 °C |
| | Heater Bed | off | 23.7°C | 0 °C |
| | Extruder Internal | | -25.4°C | |
| | Octopus Internal | | 35.1°C | |
| | Raspberry Internal | | 56.5°C | |
| | Warehouse | | -8.5°C | |

You managed to bring 5V (or maybe even more) on the pins of the MCU. Probably by using the 5V ENDSTOP. See the 5V ENDSTOP note in the previous section. To verify, unplug the endstop or change its state(trigger/untrigger). The temps should return to normal. If not, it might be a short circuit on some other connector – identify the culprit by unplugging the individual connectors.

## The provided heatsink is probably too tall

It seems that the blue passive heatsink is too tall for the SB toolhead wing/door to close. Either snip the passive to a more door-friendly height (you will need to remove around 6mm of it) or use one of the small RPI passive heatsinks (pic for illustration purposes only, you will want the small one in right bottom). Those are easily available on amazon and other stores.

Other options include

- Printing Kejar's cover/wing from https://github.com/kejar31/VoronMods/blob/main/CB-C2/STLs/CB-C2%20-%20Cable%20Cover%20RC2.stl – it should have enough space to accommodate the tall heatsink

## The MCU temps are very high during printing

| | Name | State | Current | Target |
|---|---|---|---|---|
| | Extruder | 43% | 244.9°C | 245 °C |
| | Heater Bed | 30% | 109.9°C | 110 °C |
| | Extruder Internal | | 94.2°C | |
| | Octopus Internal | | 33.5°C | |
| | Raspberry Internal | | 44.8°C | |
| | Warehouse | | 98.5°C | |

- Consider reducing stepper current (run_current:)
- Add a flat(er) heatsink (the same as in the previous section) on the MCU. Be careful not to short anything.
- Print Fan cover from https://www.printables.com/model/300272-sb2040-fan-cover (you will need to use a flatter heatsink for the stepper driver chip and solder the fan to the points on PCB


Don't forget AGND is again switchable (pin gpio15). Don't forget to use the correct voltage for the fan 🙂

## The HV ENDSTOP ends up squishing/bending wires too much

Yes :(
At this time I’m not aware of any reasonably easy way to deal with this satisfactorily. Please let me know if you know or have ideas.