

Cooling fans flippers

Caution:

If you are not comfortable working on pinball hardware and/or high voltage electronics, please get professional support for this. In general: use your common sense. Don't experiment. Don't be a nihilist. Only skilled and trained people are allowed to open this system. The manufacturer accepts no responsibility for injuries caused by unauthorized operation. Keep long hair, fingers, jewelry, etc. away from turning parts of the system.

There are some reports on so-called flipperfade of TBL users after some play.

Now my TBL doesn't have this but I experimented with a cheap solution made with cooling fans as used for RC motors. **You need the model for the 540 model motor.** Coils have a diameter of approx. 35 mm

Used material:

- Stepdown DC converter:

https://nl.aliexpress.com/item/1005001627542779.html?spm=a2g0o.order_list.0.0.5b7d79d2Kp9M8C&gatewayAdapt=glo2nld

- Cooling fan assy:

https://nl.aliexpress.com/item/1005001531147569.html?spm=a2g0o.order_list.0.0.195e79d2SiVfmC&gatewayAdapt=glo2nld

https://nl.aliexpress.com/item/33061355197.html?spm=a2g0o.detail.0.0.40c5787f0rprOy&gps-id=pcDetailBottomMoreThisSeller&scm=1007.13339.274681.0&scm_id=1007.13339.274681.0&scm-url=1007.13339.274681.0&pvid=3f749265-f11b-4a60-b72b-ffd7df12d73&t=gps-id%3ApcDetailBottomMoreThisSeller%2Cscm-url%3A1007.13339.274681.0%2Cpvid%3A3f749265-f11b-4a60-b72b-ffd7df12d73%2Ctp_buckets%3A668%232846%238113%231998&pdp_ext_f=%7B%22sku_id%22%3A%2267589700459%22%2C%22sceneId%22%3A%223339%22%7D&pdp_npi=2%40dis%21EUR%21%213.14%21%21%21%21%21%40211b5e2616566169620065944e4794%2167589700459%21rec&gatewayAdapt=glo2nld

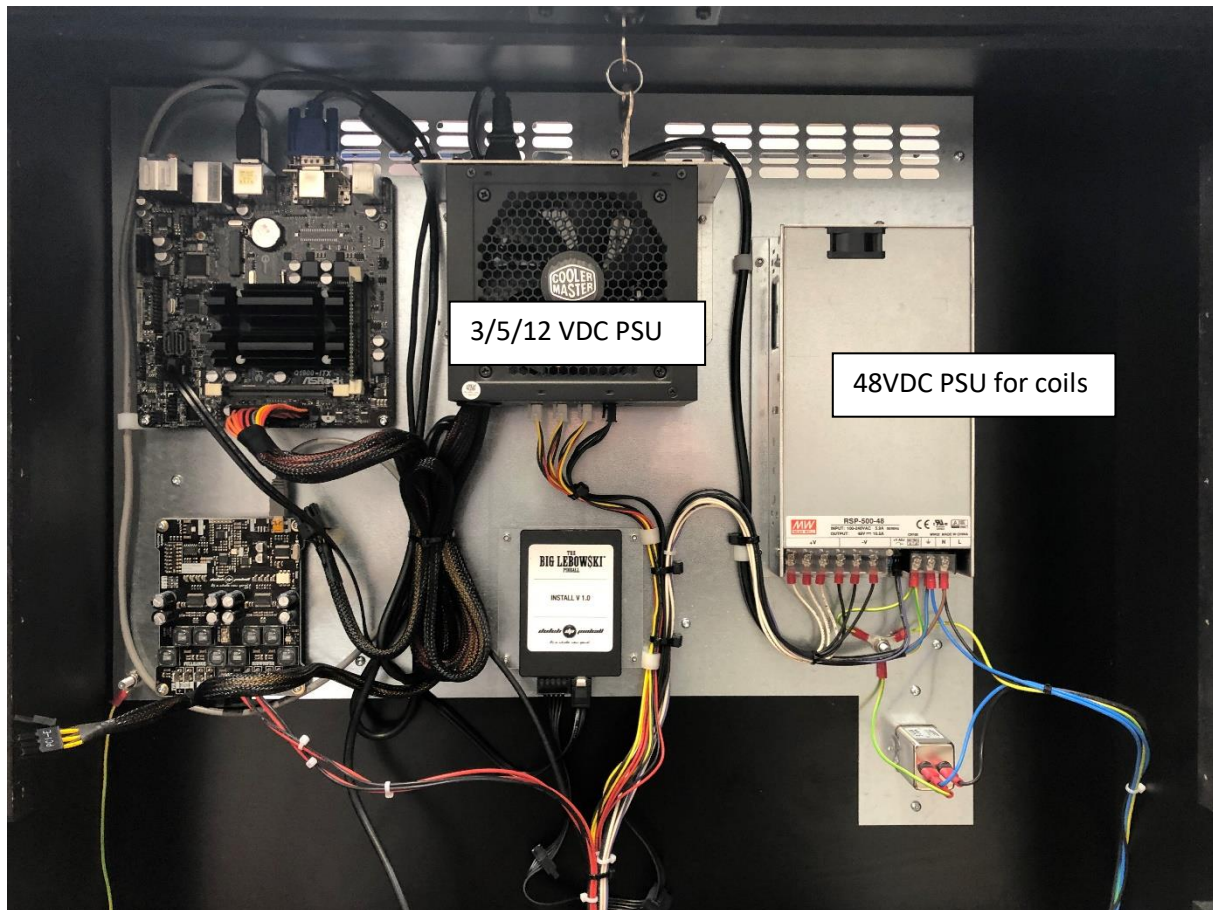
The used fans are 5VDC fans. I hooked them up to 12VDC so I can experiment with the speed of the fan via changing the supply voltage (the higher the voltage the more airflow but also more noise). Above 6VDC they are making however quite some noise and (spoiler alert) @5VDC the results were already satisfying so I would just hook it up to the 5VDC in the backbox.

Where to get the power?

Used in TBL for supplying the 5 and 12 VDC power is, at the moment of writing this application note, the CoolerMaster model G550M. You can see more info on this PSU at <https://www.techpowerup.com/review/cooler-master-g550m/>

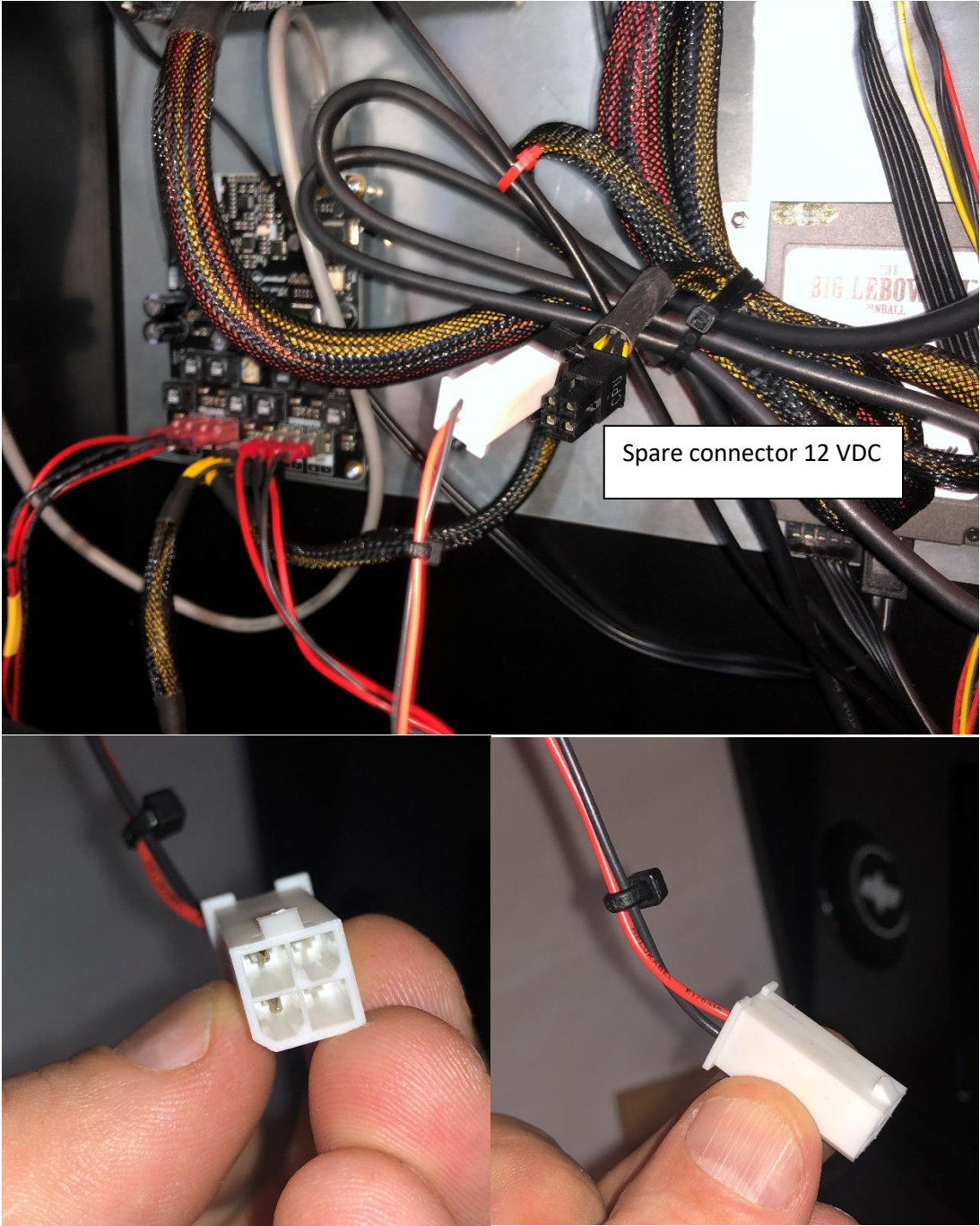
The CoolerMaster Power Supply can deliver 42A @ 12V and 20A @ 5V. There is thus some room left for your mods.

The PSU you can see on the right is the 48VDC power supply used to power the coils.



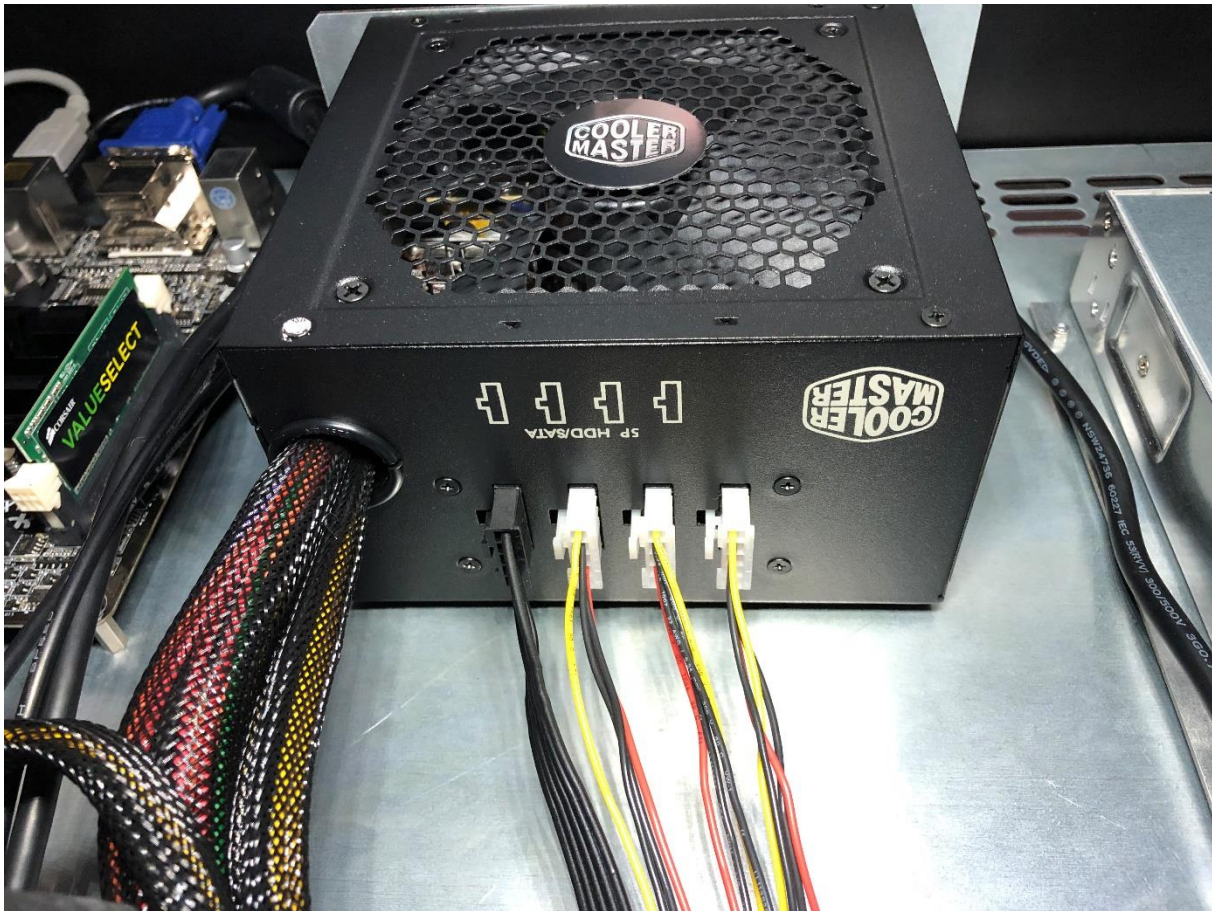
Although connecting Mods to your TBL is always at your own risk the best/easiest way to get the required electrical power is the spare connector in the backbox next to where the Translite is connected.

The used connector is a Minifit JR version; yellow is 12VDC and black is Ground



Translite connector

Another option is to make a Y-split cable on the connections coming from the CoolerMaster Power Supply G550M leading to PC, main playfield etc. Here you can get your 5VDC



Used connector here is the

- Mini Fit Jr. 1x5p Rec. 39-01-4050
- Housing: [39014050 Molex, Connector Housing, Pull Tabs, UL 94V-2 | Farnell Netherlands](#)
- Contacts: [1586315-1 Amp - Te Connectivity, Contact, VAL-U-LOK Series, Socket | Farnell Netherlands](#)
- Tool: [63819-0901 Molex, Crimp Tool, Ratchet, Molex Mini-Fit Jr. Series 24-18AWG Pin & Socket Contacts | Farnell Netherlands](#)

Pin-layout:

- Black is Ground
- Yellow is 12 VDC
- Red is 5 VDC
- The unused pin at the back is 3.3 VDC

Mounting the fans

As pictures say more than a 1000 words see here:



Mid right side you see the 12 to 5 VDC converter. If you are hooking up the fans to direct 5VDC this can be skipped. This converter has a small potmeter and turning it makes the output voltage change.

They slide over the coils like they are made for it. I used no tape.

Test results

Now I used an infrared thermometer which is not the best of method but, as its all about comparison, it should give an idea if this helps yes or no.

For the test the flipperbuttons are set stuck and thus flippers constant active. So the hold power is constant active and heating the coils. Supply voltage to the fans was 5VDC

Time	Left no fan	L with fan	Right no fan	R with fan
0 min	25 degrees C	26 degrees C	25 degrees C	27 degrees C
5 min	39	33	39	33
10 min	50	35	53	35
15 min	61	40	65	35
20 min		37		35
25 min		37		37
30 min		37		37

Again, I dont expect these values to be accurate measurement as the infrared thermometer has fluctuating results but I did several readings per measurement and its here about the difference, not the absolute value.

Clearly can be seen it helps in cooling the coils. Considering the costs are I think < USD 20 its worth a try for those experiencing flipperfade after some time playing the game

Did a 4player game which lasted like 45 minutes, coil temperature was at the start approx 26 and at the end approx 36 degrees Celsius.

For those worrying about having an airflow below the playfield and getting the coildust everywhere, I could hardly notice the airflow. Wouldnt worry to much about this.

This setup is not an official DP product and also not supported, just a test to see if this works !!