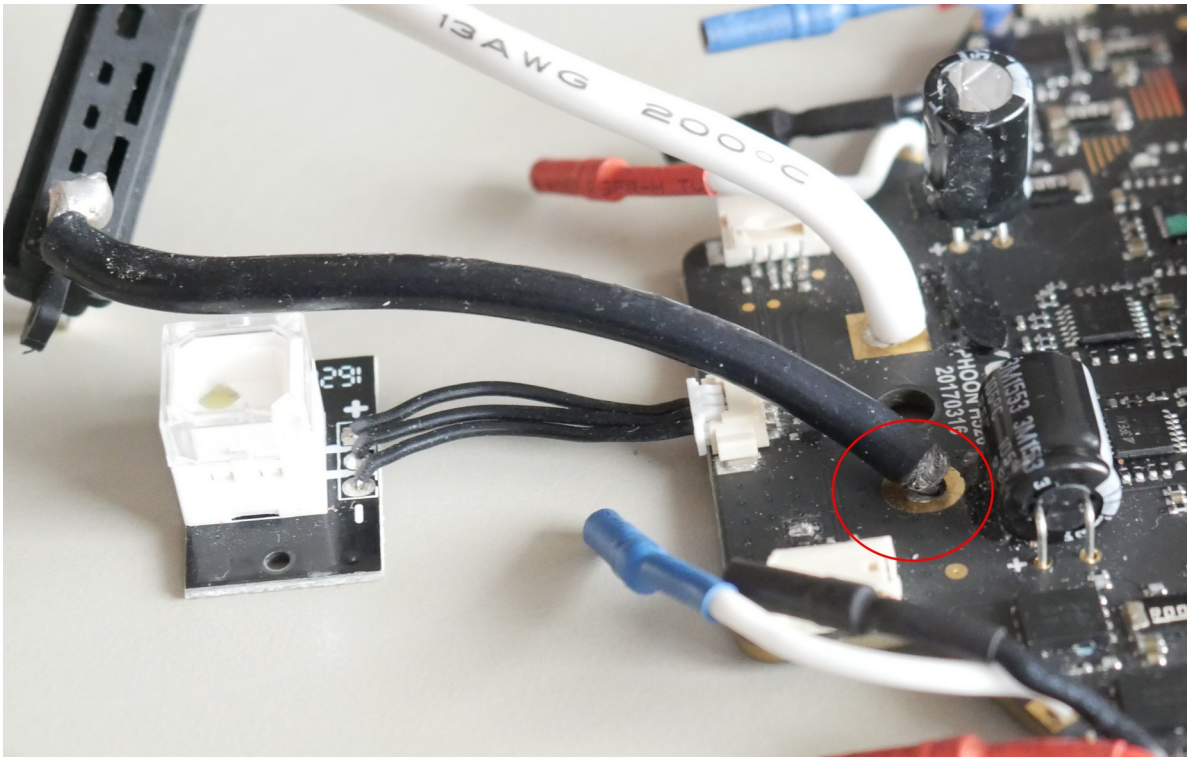
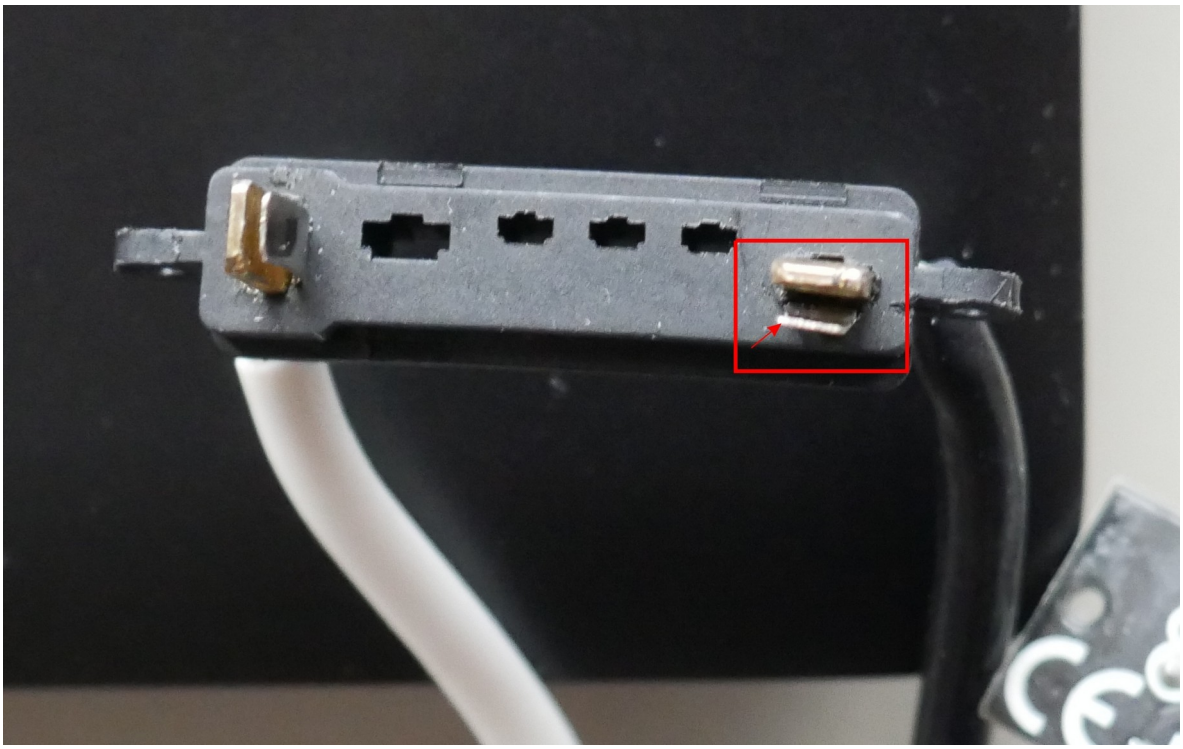
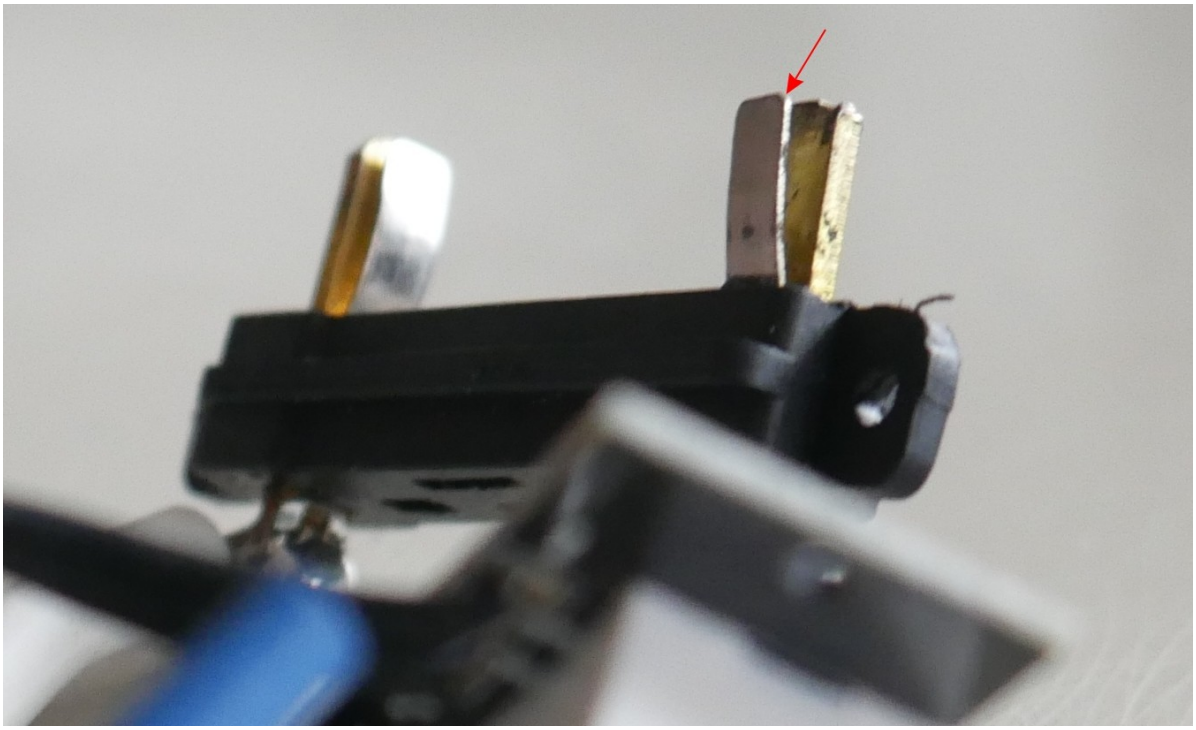
Battery contacts

The other day I got a motherboard from a crashed H520. What I noticed immediately was a burned ground cable, which was only connected to the mainboard with a few wires from the strand of the ground cable.



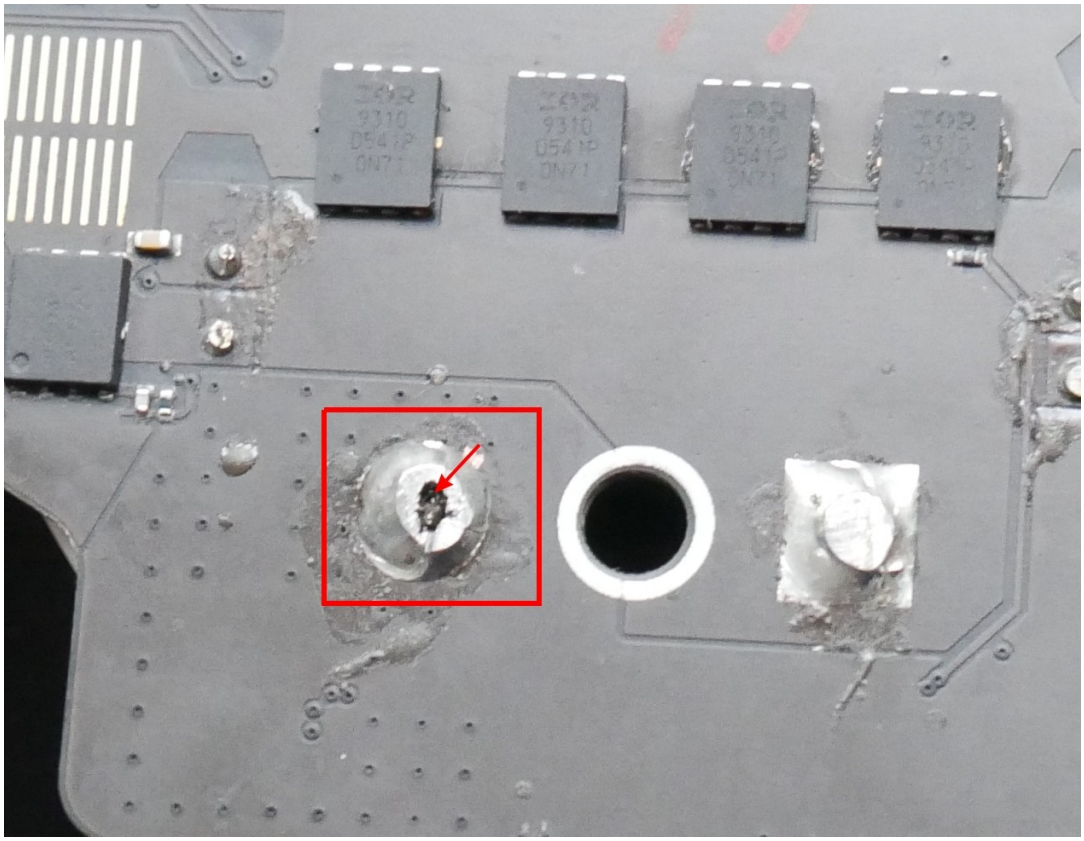
The battery contacts were also no longer usable. The contact springs had lost their spring force. In the case of the ground contact, the contact spring was completely bent.





This can be seen clearly at the ground connection. At high currents, the contact pair becomes very hot and the contact resistance increases dramatically. The voltage breaks down and the drone loses power, which can be end up in a crash.

The same result has a cold solder joint on the battery cable. Here we see both. What is cause and what is effect is impossible to say. In any case the drone crashed.



→ All in all unfortunately a typically example of such contact problems.

What can be done preventively?

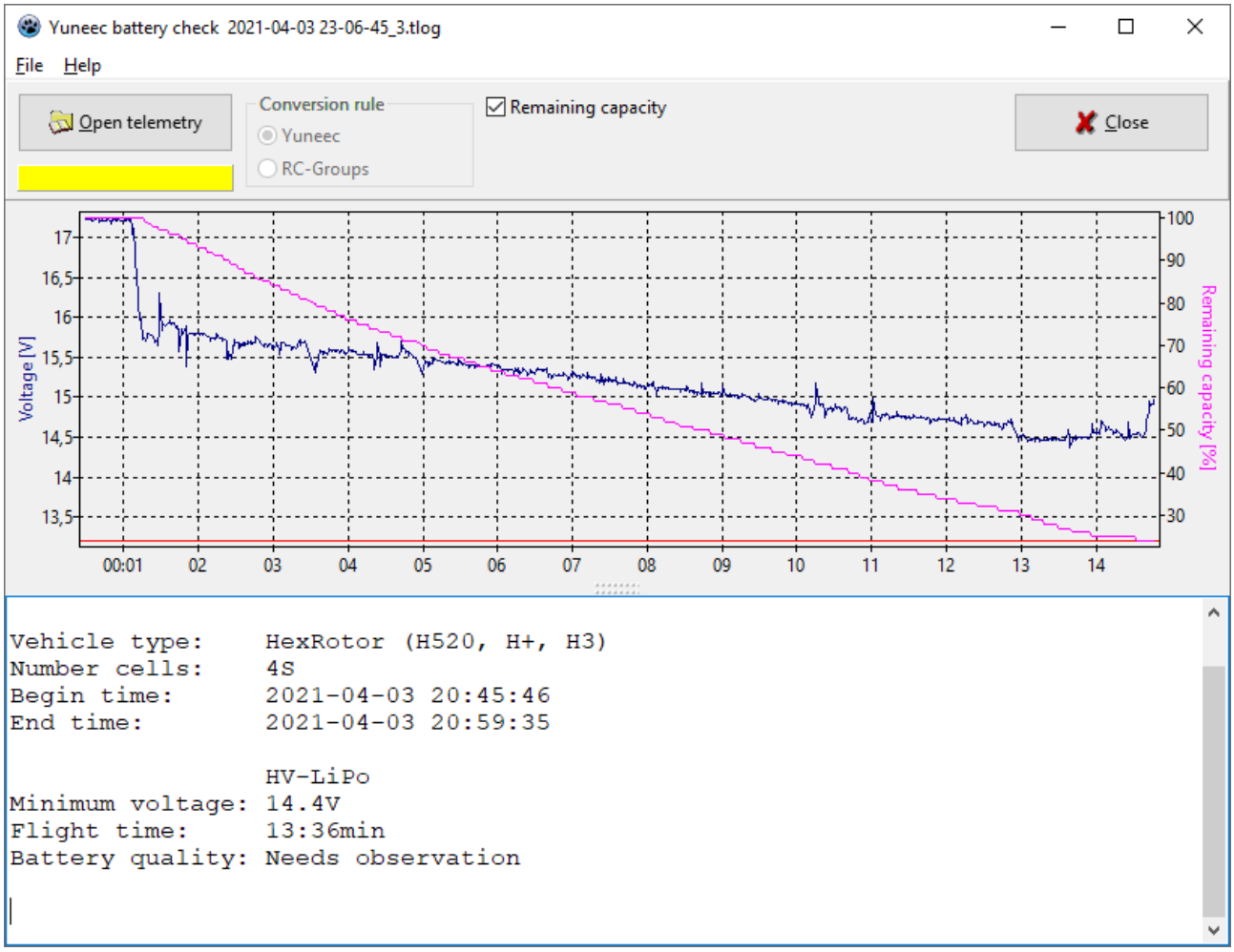
- Well, in any case, when pushing the battery in, make sure that it snaps in properly and can be pushed tightly onto the contacts. If this is too easy, you should think about it.
- Every now and then, you should look inside the battery well and check the contact springs. They should be curved and rest against the top of the contact.
- Also the battery contacts should always be subjected to a critical inspection.
- Check to see if there are any severe voltage drops in the flight logs when the drone is taking off. This indicates either an old, weak battery or such problems of the battery contacts.

Regular checking of the voltage chart in the flight logs is highly recommended anyway, in order to detect power supply problems before it comes to a crash.

To simplify this, there is a battery test tool: https://github.com/h-elsner/BatteryCheck

Battery check tool

This program was made for fast evaluation of flight batteries under real load.



The check requires an entire flight with a fully charged battery. The assessment is (and can be) only very superficial and is dependent on or influenced by many factors. Nevertheless, it can be seen intuitively, at least on the diagram, how the discharge behavior of the battery is.

The advantage over pure voltage measurement is that you can see the voltage curve under load. If the voltage drops sharply under load, this indicates a high internal resistance of the battery. This happens gradually with aging or relatively quickly with defects.
In any case, it is questionable to fly batteries that can no longer be fully trusted. Therefore I consider a constant observation of the batteries necessary (post-flight-check).
This tool should simplify that.

To see the voltage history, you have to load the telemetry data from the flight. Usable are:

- TLOG Dateien from PX4 Autopilot,
- Telemetry CSV-Dateien from legacy Yuneec drones,
- the related pedants from Mantis Q,
- Breeze,
- Blade Chroma,
- Blade 350QX (if controlled by ST10).

Assessment for a voltage chart

In the attached screenshot we see the evaluation of a TLOG file from the H520, which contains three flights with three different batteries, here called segments of the file.

- Segment 1 shows the typical course of a good battery with long flight time and low voltage drop.
- Segment 2 shows an aged battery, which should be inspected continuously.
- Segment 3 shows a defective or at least very old battery that belongs in the scrap. This battery actually caused a crash.