Notable design decisions in ver 1.80

- Improved "Battery reverse polarity protection" -now it should be safe to connect also battery first to the charger.
  For some thoughts: http://blog.deconinck.info/post/2017/12/22/18650-Battery-charger-reverse-polarity-protection
  Although we have higher voltages (up to 6cell battery) so had to improve that further.
  The original was using LM324 inputs, but LM324 is suspectible to output phase reversal.
  https://www.google.ee/search?q=op+amp+output+phase+reversal+lm324&ei=qM2tW52FDKyZlwTqi6HQAg&start=10&sa=N&biw=1309&bih=689
  So better avoid using LM324 inputs outside their maximum allowed voltage limits.
  Also the new circuit should make it safe to connect battery first to the charger. No matter correct polarity or not. Prevously there was problem that battery reverse protection opamp itself needed supply connected first.
- Redesigned cell2 individual voltage measurement. Now uses also diff amp. same as cells 3...6.
  Used the extra opamp that is freed from the battery reverse protection. Prevously it was only 4x voltage divider. This should improve accuracy on that.
  Needs software calibration adjustment, so need to figure that out.
- Redesigned main converter circuit slightly. Now the current error limit is compared with comparator(U3A). This makes it definite current limit 6.5A by default.
  Formula for current limit: I= 5V/15,47/0,05 (comparator treshold[V]/current measurement amp. gain/current sense resistor value[Ohm])
- MOSFETs in the sell balancer load switches.
- Through hole resistors for balancer loads.
- Redesigned discharger circuit. Now uses two darlington NPN transistors to dissipate the heat. And larger value resistors. TIP120 is suitable for analog non-switching applications in compared to previous IRFZ44 that is designed for switching applications. Pinout is compatible. Can still also use MOSFETs without modifications. Assume max 20W dissipation, then IRFZ44 maximum allowable heatsink temperature calculates to 175-40= 135C. For TIP 120 max heatsink temperature at 20W is 150-40=110C. MOSFET may still be slightly better. Must conduct testing.
  Maximum estimated discharge power is 2x2=4W on the resistors plus 2x20W on the transistors, total 44W. Probably good idea to use thermal sensor.
- Upgraded voltage reference to 5V.
  Recalculated all circuits for 5V ADC reference. Should have the benefit of added accuracy. Also it is nice to use all same value resistors in the cell voltage measuring opamp circuits. Differential amplifiers gain is now increased to 1. As circuit components are all adjusted accordingly so no major firmware rewriting nessesary. Need to check discharger calibration in software and also main voltage measurement -- ADC input dividers might be slightly off, so probably needs new calibration values.
- Atmega32 microcontroller
- In general should still be compatible with the cheali-charger imaxB6 atmega32 version.For further details of how to find the hex files for flashing:https://github.com/stawel/cheali-charger/tree/master
- holes in the board at the places where power transistors tab holes are, this makes possible to screw mount thansistors to the baseplate.
- PCB mounting is compatible with the IMAX B6 clone enclosure, but can also be used standalone with custom case, only needs some metal plate to be mounted on for cooling.