Cheali Charger

User Guide (under development)

Contents:

1,1 Introduction

Thanks Paweł Stawicki the software author. The program has helped a lot of small change, solved all user records,recommendation. Https://github.com/stawel

Thanks Stephen Magi (alias HC) has helped in the documentation and the website has seen us with lots of useful information. Http://www.rc -miskolc.emiter.hu /

The software is written for the popular Bantam clones can not exactly balancer/charge. This is primarily during manufacturing inaccuracy or no calibration performed respectively (ImaxB6). Some manufacturer's products are fairly accurate to the original software ex Turnigy Acucell6. **If you have no problems with our charger and / or are not skilled electronics technician then please do not make this conversion charger.** The software exclusivity works 6 cells Bantam clone chargers Never make 8-cell version or is not compatible chargers..

Features:.

2.1

Li-ion, LiPo and LiFe:
- charge
- fast charging
- charging and Balancing at the same time
- discharge
- balancing
- storage
- storage and balancg
- life formatting (D/C format) (experiment. Info from Raytronic), (only modded fw)

NiCd and NiMH:
- charging method: -dV/dT
- discharging
- cycle charge (discharge-charge only)

NiZn: - not fully tested
- charging
- fast charging
- charging and balance at the same time
- discharge
- balance

Pb - not fully tested
- charging
- discharge

Li-Ion 4.35V supported , (only modded fw)
Unknown Type (26.1V to any voltage adjustable) , (only modded fw)
cell internal resistance measuring
total pack resistance measurement
battery wire resistance measurement
internal and external temperature monitoring if available
overcharge, discharge monitoring
Watt and Watt-hour display , (only modded fw)
in real-percent display , (only modded fw)
simple remaining time (experimental) , (only modded fw)
mains voltage monitoring
32 battery memory
LogView support
calibration
reverse polarity detection

1.3 Compatibility: Currently the following chargers have been tested:
ImabxB6 (original and clone)
Turnigy Accucel6 (old PCB's)
Turnigy MAX200 A6-10
GT Power A6-10
Turnigy MEGA400Wx2
Turnigy MEGA200Wx2

keyboard:

the keys from left to right, the overall function of
1. stop / escape. Usually this can be something to stop and exit the menu one level above
2. minus. navigate menu move up or reduce the value
3. plus. navigate menu lower or increase the value
4. enter / start. this finish or start to enter a flashing value menu step or program start (long)

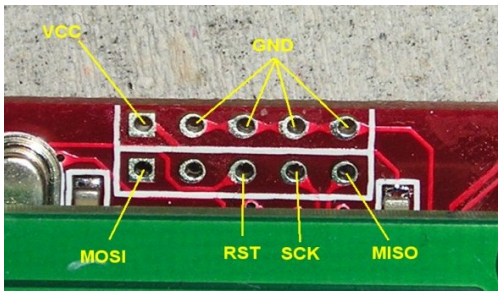
2.1 Upgrade / Calibration

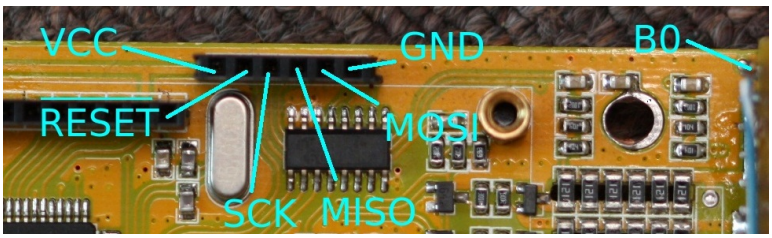
Required Tools:

- ISP Programmer Adapter (example USBASP, AVRISP MKII)
- accurate voltage meter
- precise current meter
- 0.1 inch pins (6-12pcs)
- soldering iron
- wire
- Burn-O-Mat or avrdude or other ISP programming software

2.2 build ISP interface

the different vendors are set up differently ATMEL ATMEGA32 MCU ISP pins. Some manufacturers have chosen standard 10-pin design,some of the one-line 6-pin terminals.



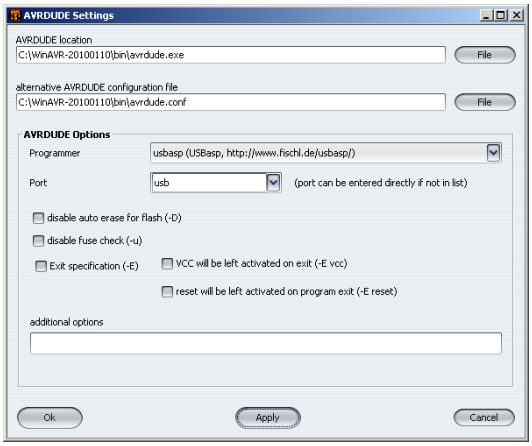


3.2 Steps:

1.
Connect to our ISP programmer the right points.
Remove "VCC from-usb". The charger not enough power from usb.
Connect power supply on the charger.
optionally: install isp programming interface driver

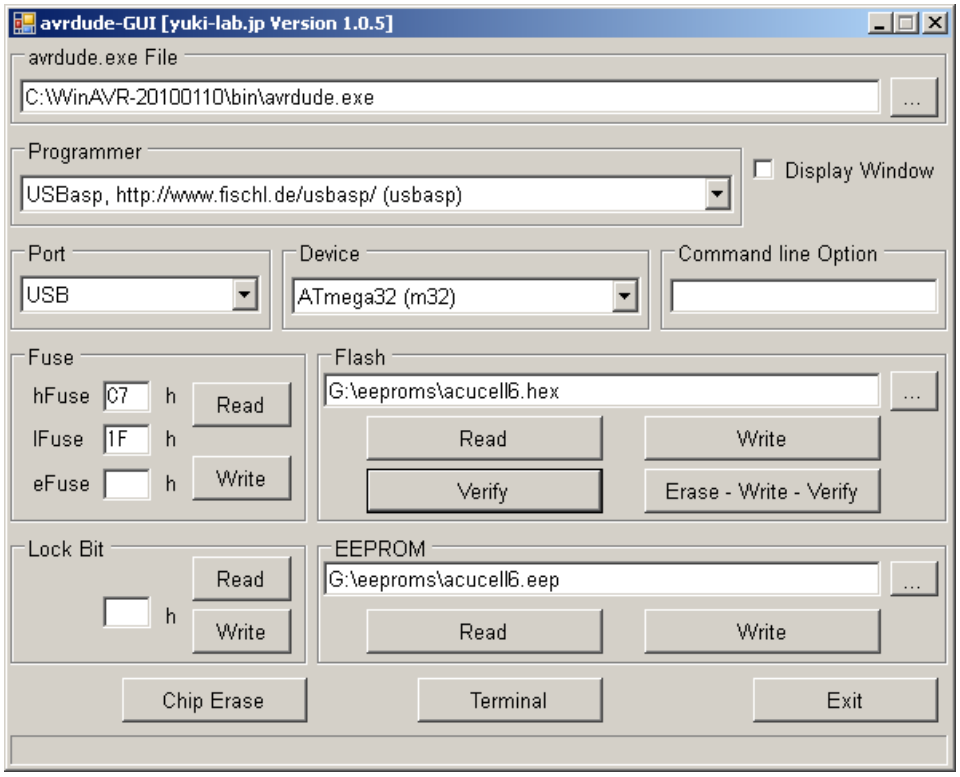
2 install the avrdude / avrstudio / burn-o-mat software.

USBASP with burn-o-mat setup:



GUI other detailed installation

avrdude-gui settings example

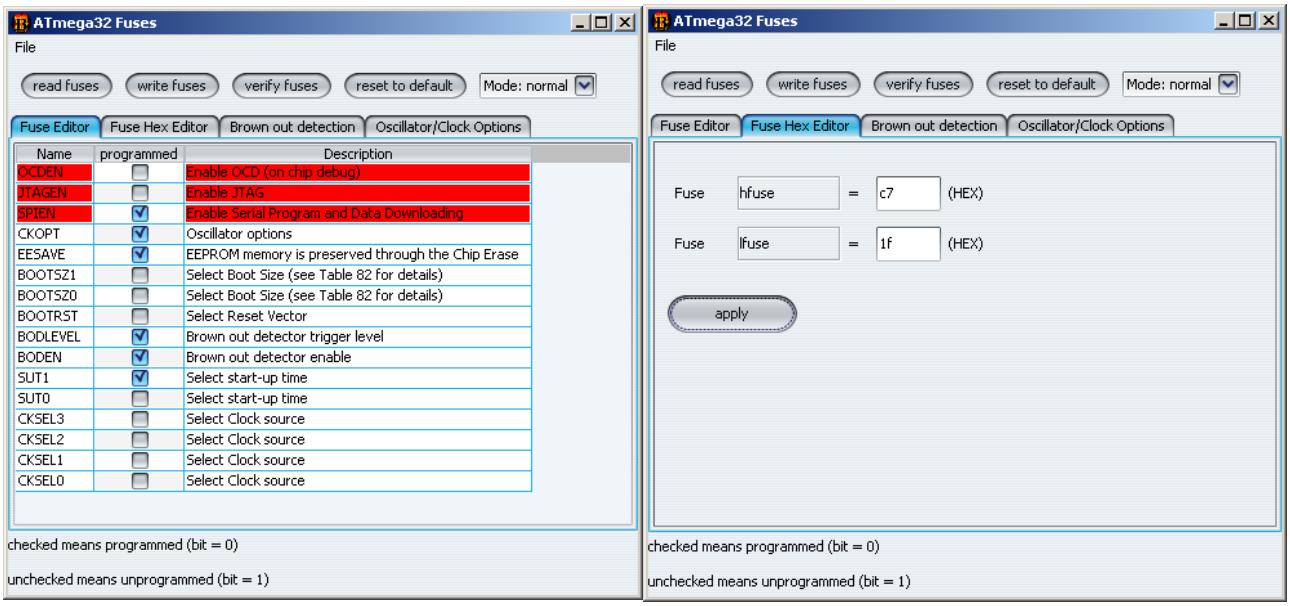


it is better to use as a burn-o-mat.

3 As a first step in trying to backup original software and EEPROM content.
against most cases protected by the MCU read, but if you're lucky. WARNING! Atmel chips at read the content if protection bit set but read out the false information. It is necessary to control for example. a text editor.

4 this clearing+flashing relasing the protect bit (unlock the mcu).The burn-o.mat is not able to do it “erasing” separately. Or run from the command line or in the 6 points used (it will cancelling the protect bits)

5 Enter FUSE bits lfuse: 1F Hfuse: C7. **Carefully**
example *avrdude.exe -C avrdude.conf -p m32 -P usb -c usbasp -u -U hfuse:w:0xC7:m -U lfuse:w:0x1F:m* or FUSES button and then the burn-O-Mat for the following options:



Apply button and then WRITE FUSES. If all goes well you can now burn Cheali software.

6. FlashROMwriting. please check the tested compatible chargers:
https://github.com/njozsef/cheali-charger-test1/blob/master/hex/modded_by_njozsef_TEST_version/compatibe_chargers.txt

Paweł Original version: https://github.com/stawel/cheali-charger/tree/master/hex
Modded: https://github.com/njozsef/cheali-charger-test1/tree/master/hex/modded_by_njozsef_TEST_version

Now You should see a "ChealiCharger welcome" screen.

1.3 Calibration

required 1 x **6-cell lipo** is not fully charged, balanced battery . Voltmeter (accuracy), power meter, cables.
Note that the charge current and discharge current calibration to take place during the setting of the battery.

2 go to Options / Calibrate menu

voltages calibration

Connect the battery on both connector (main cable, Balance) Use a voltmeter set to the correct voltage

Vin. power supply voltage
VB1 to VB6: cell voltages . VB1 is the negative wire closer.
The display set to the correct readings. Enter button to finish.

If you can not access this menu, **bat disc. Use the RESET DEFAULT menu to reset the calibration. Attention! Reset of all parameters.**

currents calibration

four measurements will be needed. Connect the cur.meter of the main cable. Make sure the measuring limit.
Allow it to be stable electrical connection. Not a good solution is to manually bind the
cables.,

Go to "Options / Calibrate / I charge" menu,

connect the battery. 50mA menu item's value will be increased by the value of 50mA until the ampermeter shows. Then enter.

1A-1A and calibration should be performed at the same. (These settings are different for different power charger)

Let's go through the discharge (options / calibrate / I discharge) menu and perform the same in there.

"d:xx" is only reserved for debug information.

WARNING: the battery will be charged and discharged with high current!

During the current calibration is not activated in any circuit protection. If the values are larger the charging performance, or set incorrectly, it can lead to irreparable damage to the charger.

after ready, press exit button.
Now the software checks the calibration limits (modded version only). If this is not correct, it shows an error message.

Calibration errors (modded only):

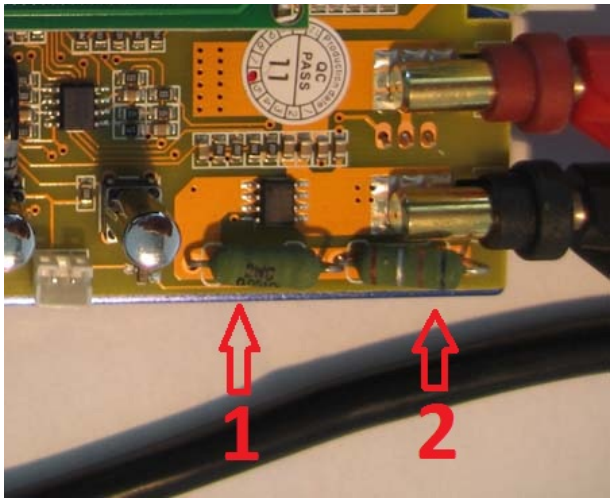
F1: switching power supply control error
F2: internal switching power supply current measurement error
F3:discharger control error
F4:discharge current measurement error

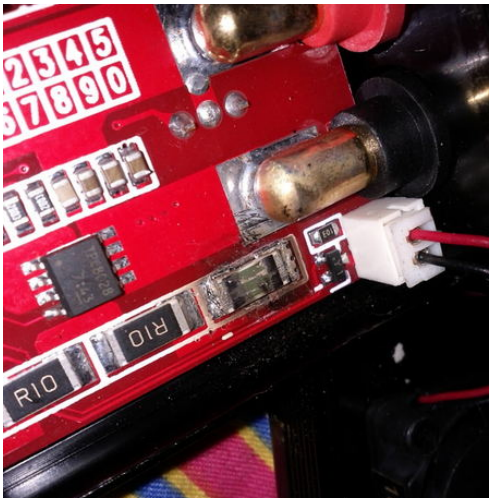
causes and fix:
When these errors are correct calibration usually hardware indicate failure:
This failure can usually use the charger, but you can spend less current. If you do that you're probably experiencing the factory software was not able to work at full power, but the display as it showed :-)

F1, F3: control fault. Rare fail. Generally power-FET or control failure, or failure buffer capacity.

F2, F4: current measurement error. Frequent. About 2 or 3 power resistor can be solved by replacing

1: .0.05ohm (or 2x 0.1ohm SMD parallel depending on manufacturer)
2: 0.5ohm





Thermometer calibration:

It should be exercised in the same way to two, preferably at temperatures far above. For example, 20C and 60C. .
Hairdryer can use one ***of the default values for temperature calibration is usually provide adequate precisionmenu.*** *not necessary to*

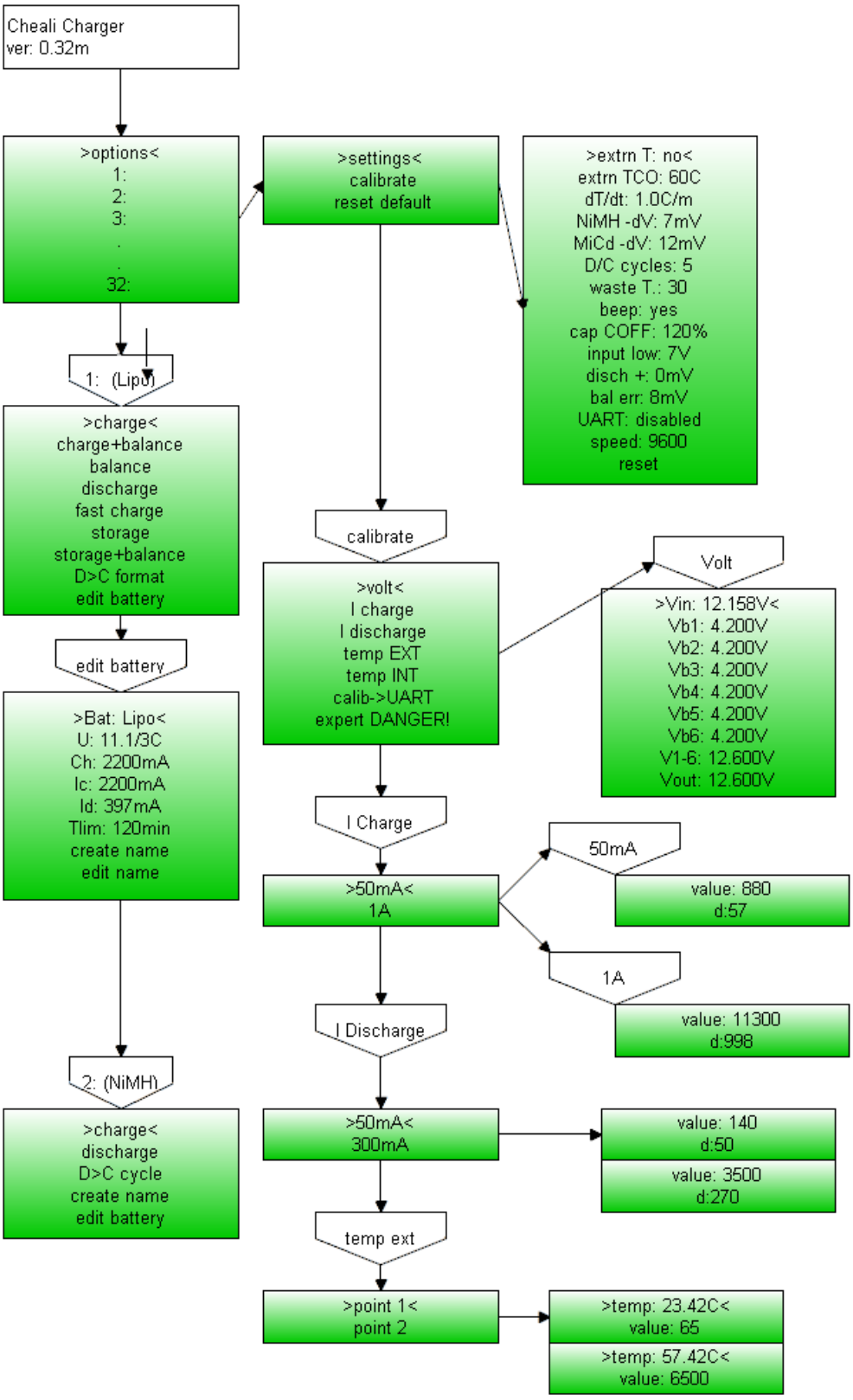
calib-> UART
Debugging purposes, send a text data packet to the current calibration data. By default 9600 baud 8 bits no parity 1 stop

DANGER Expert menu (only 50-80W chargers)
see https://github.com/stawel/cheali-charger (Suitable for charging without this),

reset the default:
delete all calibration/setting/battery data. (It is useful for clean recalibration)

The charger can not be used while is not calibrated. Not to give false information because of damage to the charger and potential to cause fire.

4 Operation


Cheali Charger
ver: 0.32m
>options<
1:
2:
3:
.
.
32:
>settings<
calibrate
reset default
>extrn T: no<
extrn TCO: 60C
dT/dt: 1.0C/m
NiMH -dV: 7mV
MiCd -dV: 12mV
D/C cycles: 5
waste T.: 30
beep: yes
cap COFF: 120%
input low: 7V
disch +: 0mV
bal err: 8mV
UART: disabled
speed: 9600
reset
1: (LiPo)
>charge<
charge+balance
balance
discharge
fast charge
storage
storage+balance
D>C format
edit battery
edit battery
>Bat: Lipo<
U: 11.1/3C
Ch: 2200mA
Ic: 2200mA
Id: 397mA
Tlim: 120min
create name
edit name
2: (NiMH)
>charge<
discharge
D>C cycle
create name
edit battery
calibrate
>volt<
I charge
I discharge
temp EXT
temp INT
calib->UART
expert DANGER!
Volt
>Vin: 12.158V<
Vb1: 4.200V
Vb2: 4.200V
Vb3: 4.200V
Vb4: 4.200V
Vb5: 4.200V
Vb6: 4.200V
V1-6: 12.600V
Vout: 12.600V
I Charge
>50mA<
1A
50mA
value: 880
d:57
1A
value: 11300
d:998
I Discharge
>50mA<
300mA
value: 140
d:50
value: 3500
d:270
temp ext
>point 1<
point 2
>temp: 23.42C<
value: 65
>temp: 57.42C<
value: 6500

4.1 settings Menu

settings

Extrn T: yes / no	external thermometer Yes / No
Extrn TCO: 60C	outside temperature cut-off level is switched off when the outside thermometer reaches this level.Usually Nixx battery Use
dT/dt: 1C/m	maximum outdoor temperature growth rate (trend)
enab -dV:	enable -dV charge method on Nixx.
NiMH -dv 7mV	breakdown voltage set for NiMH battery packs This value can be different for different producers ofdv.
NiCd -dv 12mV	breakdown voltage set for NiMH battery packs
D / C cycles 5	number cyclic charging and Lixx format, (only modded fw)
waste T: 30m	downtime from the discharge-charge-discharge:, (only modded fw)
beep:yes	audio, (only modded fw)
cap Coff: 120%	safety shutdown of the capacity xx% of the
input low: 7V	safety switch to set voltage is reached is recommended(in about charging to use car battery) value 10V
disch +: 0mV	shifted the value of the discharge voltage
left err: 8mV	if the set value are within the maximum difference between the cells will stop balancing. Smaller values may have a longer balance time.
UART.disabled	Enable serial data. Use NORMAL mode.
speed..	9600 Serial port speed in baud
reset	Momentary is not implemented

unique battery menu

Bat:	battery type setting
U:	voltage / cell number
Ch:	Battery capacity mAh or Ah
Ic:	charging current
Id:	discharge
Tlim:	maximum charging time limit. (Safety feature only modded versions)

create name	automatically name creation
edit name	edit name

screen shots

START button is pressed, we get a picture of the actual battery status information.

The charger not fully automatically recognize the battery type in each case,so always be attentive (Pawel please help google is bad)

details.

Program type**(NiCd),**set voltage and cell count**(4.80V/4C),**program type**(Ch)**
current battery percentage**(99%),**the current voltage**(11.6V),**.the setting capacity

the case of Lixx last value shown and connected balancer cell count the balancer port

to charging START : press the START button and hold (RIGHT BUTTON)

Screenshot. incomplete

basic display patterns realtime data

combined withscreenshot Watt Watt-hours per cent ETAdisplay (modded version)

cell voltages

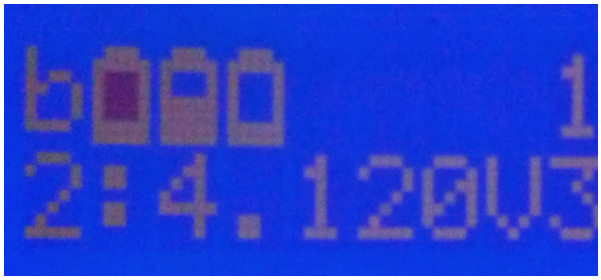
cell internal resistance

battery internal resistance and complete the wiring resistance along with all of

voltage the main cable and the port of balance

supply voltage and down limit

balancerstatus icons. Will flash to indicate the current working cell (modded version)



200W and higher chargers graphical display (modded version)

time display, all the time, balance time, charging time

setting limits (Information only)

temperatures (50W chargers when no external thermometer then, unfortunately, we do not see anything

error messages:

T intern
internal temperature is too high. Unfortunately, the 50W charger is not present internal thermometer, so this Message was there did not appear.

Bat disc
Cut main cable or removed during charge or poor calibration of the battery charge data.

Input V
too low Input voltage

cap COFF
capacity limit reached charging (the default set is 120%)

T. Limit
the set time limit has been exceeded charging (modded version only)

ext TCOF
external temperature reading exceeded the set value

REV. POLARITY
reverse polarity

please cal.
Uncalibrated charger (minimum voltages and currents to be calibrated)
(modded version)

50W chargers hardware design fault due Lixx discharge is unable to accurately measure the first cell voltage therefore there now have a "n.a." visible. THIS IS NOT FAILURE.

continue …… (I hope)