

The CCSEB Evaluation Board can be assembled for more than 10 cells up to 36 cells.

1) Transformer Voltage

The transformer voltage and the transformer power has to be adapted to the higher battery voltage.

- a) Charge current more than 1A:
Number of cells x 2V = Transformer V_{eff} .
- b) Charge current less than 1A:
Number of cells x 1.8V = Transformer V_{eff} .

2) Battery Voltage

Resistor R9 determines the range of the battery voltage (unlimited number of cells).

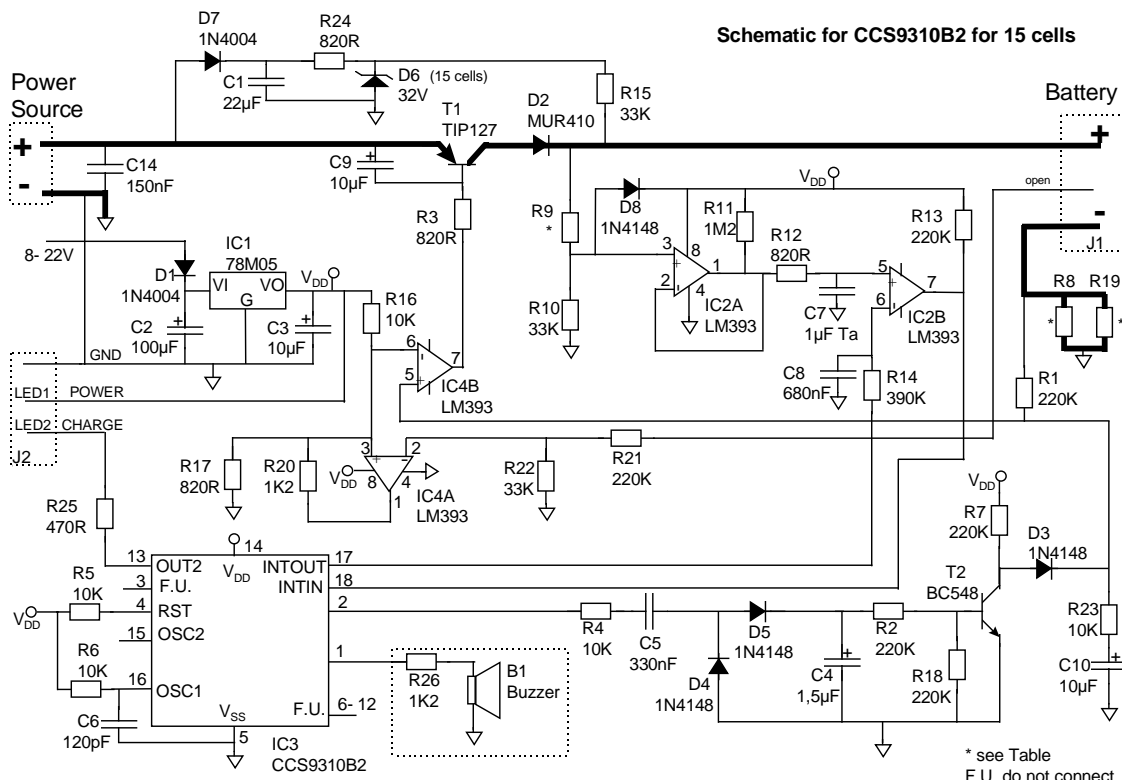
Calculation of R9:
$$V_{nom} = 1,2 * \left(1 + \frac{R_9}{R_{10}} \right) \quad R_9 = R_{10} * \left(\frac{V_{nom}}{1,2} - 1 \right)$$

Example for R10=33k: for each battery the resistor has to be increased with 33K

Cells	1	2	3	5	10	12	15	20	36
Voltage	1.2	2.4	3.6	6.0	12	14.4	18.0	24.0	43.2
R9	1K	34K	67K	133K	298K	364K	463K	628K	1M156

3) 15 Cells

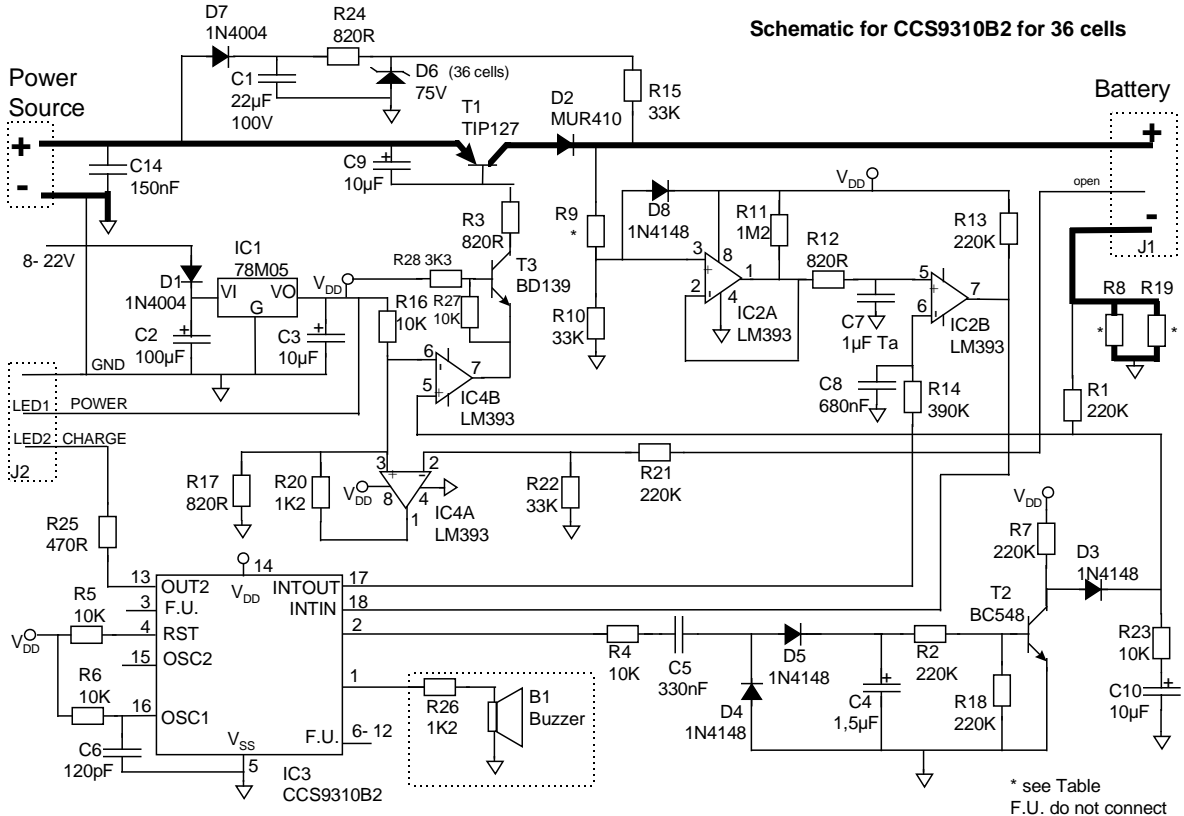
Because the comparator LM393 (IC4) is dimensioned for 35V, only the voltage regulator 7805 (IC1) must be connected to a separate transformer output and to a separate rectifier (!!same GND), see schematic for 15 cells.



4) 36 Cells

Connect D1 (Input for IC1) to a separate transformer output (see 15 cells).

IC4 must be protected with an additional transistor T3 (e.g. BD139), resistor R27 (10K) and resistor R28 (3K3), see schematic for 36 cells.



5) The parts C1, C9, T1, D2, D7 in the circuitry have to be dimensioned for the higher voltage!

In general the number of cells in the battery pack should be as small as possible, because the overall capacity is only as good as the capacity of the weakest cell!!

Comments: Our aim is to help you best in the design of superior chargers with CCS-technology. This Application Note was carefully composed. However, according to the wide range of solutions not all aspects and possibilities can be covered by this publication. Furthermore errors cannot be completely excluded and we do not provide any responsibility for the given applications. Therefore we welcome your response comments and suggestions for further improving our CCS-Application Notes. **Thank you!**
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