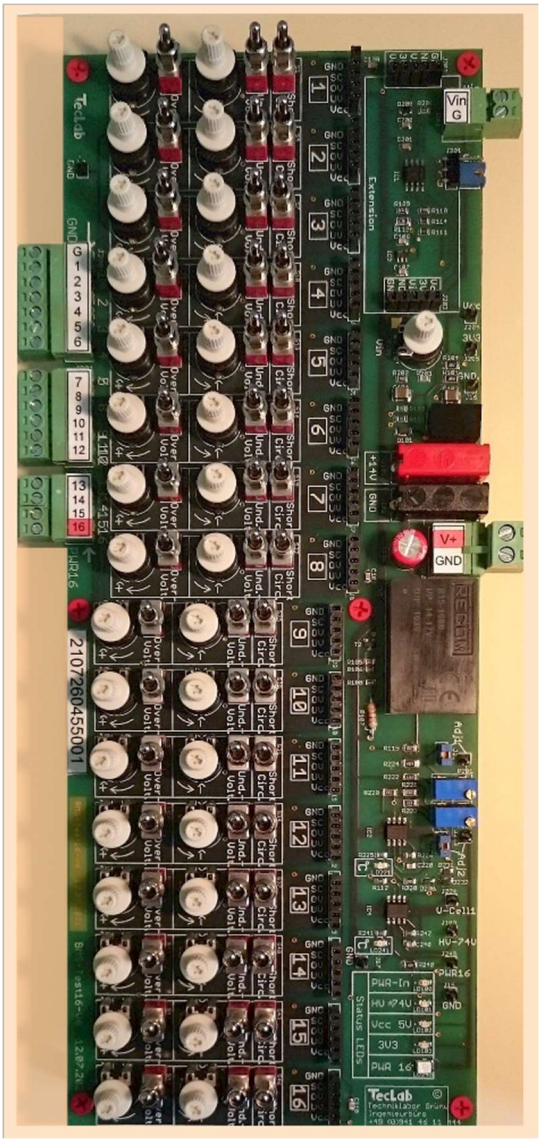
The BMS-Test16 board has been developed as a prototype to simulate Litium Jonen Battery packs with **2 up to 16 cells**. The cell voltages can be set by a single input-voltage **Vin** in the range of **2 to 4,5V**. An onboard trim potentiometer or an external voltage (set the jumper **J201**) can set **Vin**. The board requires a working input voltage between **14V and 17V @ 0,1A** (the current will increase when a BMS system is connected). The highest cell connector **PWR 16** delivers up to 40 mA current supporting the external BMS circuits.
This document describes the board-connectors, interfaces and working voltages.




Techniklabor Grünwald
Ingenieurbüro
Cecilie-Vogt-Weg 28
93055 Regensburg
0941 46 11 444

**Absolut maximum ratings:**

| | |
|---|---|
| Maximum power input voltage (**J100, J101, J102**) | 17 V |
| Maximum power input current @ maximum load | 350 mA |
| Maximum operating voltage on board | 74,6 V |
| Maximum steering input voltage **Vin** | 5 V |

**Recommended operating conditions:**

| | |
|---|---|
| Power input voltage | 14 V |
| Number of cells | 3 up to 16 |
| Nominal operating temperature | 0 °C to 50 °C |

**Board specific values: Board 2107260454000** Measured @ 20ºC

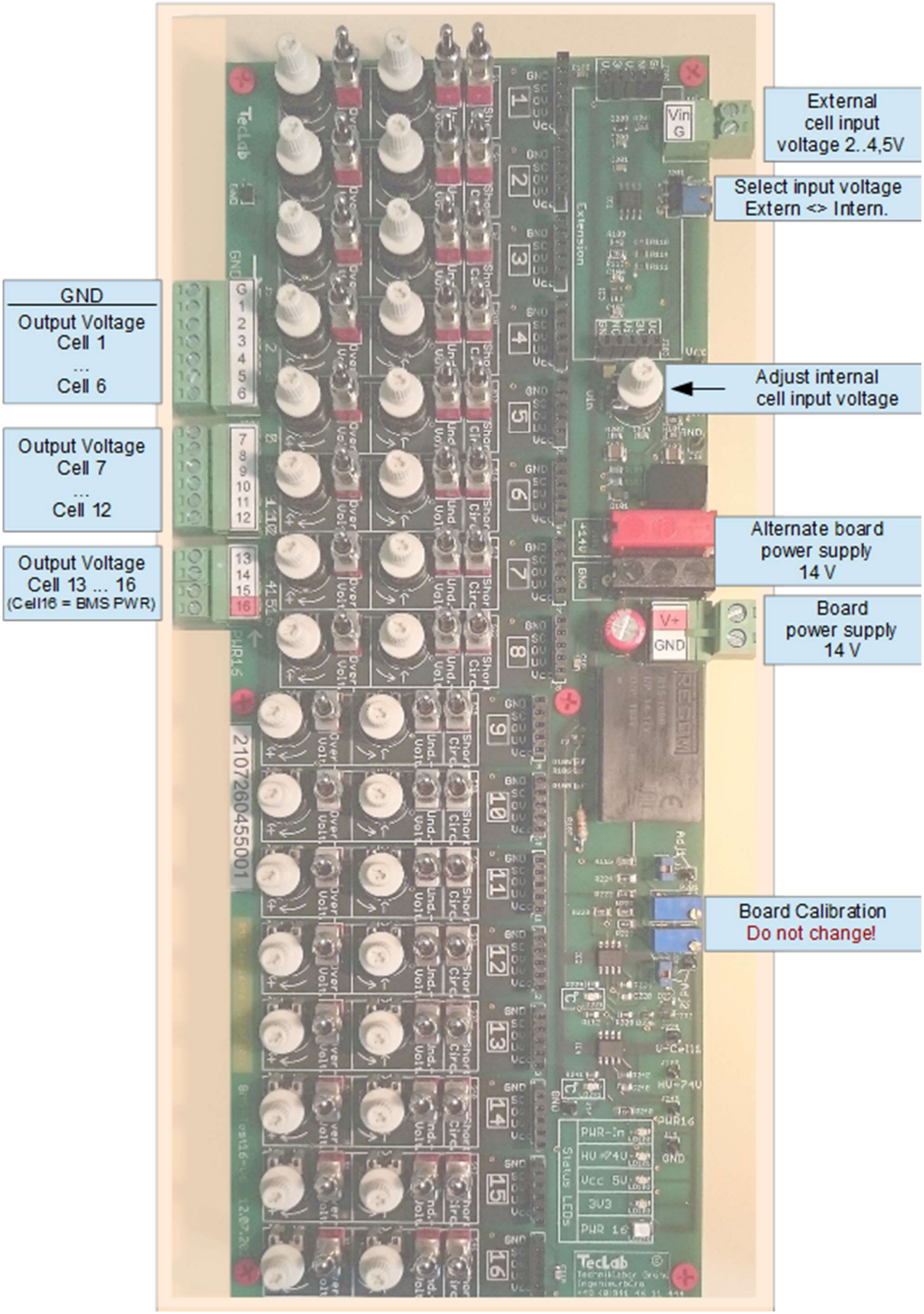
| **Maximum Voltage Values** | | |
|---|---|---|
| R105 built in (HV-74 adjust) | 150 | kOhm |
| TVS D102, P4SMAJ78A | 92 | V |
| HV-74 Voltage | 74,5 | V |
| V-Cell max | 72,5 | V |

| **Ripple** | | |
|---|---|---|
| HV-74V | 24 mVss | HF |
| V-Cell16 | 6 mVss | HF |
| Cell1 | 2 mVss | HF |
| (Tektronix 2445B | 150 | MHz) |

| **HV-74 Voltage Thresholds** | | |
|---|---|---|
| Switch to 59V below | 44 | V |
| Switch to 74V above | 51 | V |

| **Highest Cell Voltage @ Vin** | | |
|---|---|---|
| V-Cell16 @ Vin 4,30V | 68,6 | V |
| V-Cell16 @ Vin 4,40V | 70,2 | V |
| V-Cell16 @ Vin 4,50V | 72 | V |

| **Cell Voltage Setting area (each cell element)** | | | | |
|---|---|---|---|---|
| Cell x @ Vin 4,00V | OV min | OV max | UV min | UV max |
| | 4,010V | 6,232V | 2,183V | 3,064V |
| Cell x @ Vin 4,00V OV and UV together | OV max & UV max | | OV max & UV min | |
| | 4,223V | | 2,715V | |
| Cell x @ Vin 4,00V OV and UV together | OV = 5,77V & UV max | | OV = 5,77V & UV min | |
| | 4,000V | | 2,620V | |


GND
Output Voltage Cell 1
...
Cell 6
Output Voltage Cell 7
...
Cell 12
Output Voltage Cell 13 ... 16
(Cell16 = BMS PWR)
External cell input voltage 2..4,5V
Select input voltage Extern <> Intern.
Adjust internal cell input voltage
Alternate board power supply 14 V
Board power supply 14 V
Board Calibration
Do not change!
TecLab
Extension
PWR-In
HU +24U
Vcc 5U
3V3
PWR 16
Status LEDs
GND
V+
Vin
G
+14V
2107260455001

### Cell-Element Features

Each of the 16 cell elements provide the following features:

Cell voltage common with all other cell elements. The terminal of cell 16 provides current up to 40 mA to supply a BMS system circuit. If using smaller cell pack than 16 cells, this terminal remains further as BMS supply. Its voltage is the same than the highest cell of the reduced cell pack.

Under voltage (UV) simulation with trim potentiometer for specific under voltage values.

Short circuit (SC) connects the upper cell voltage pin with the upper cell voltage pin of the lower cell so the cell voltage becomes 0 V. SC must also be used to reduce the number of cell packs. E.g. to simulate a cell pack of 10 cells, the SC switches of cell 11 up to 16 must be switched ON.

Over voltage simulation with trim potentiometer for specific under voltage values.