PC Configuration toolbox

LIBAL N-BMS CREATOR™

LiBAL n-BMS CREATOR™ content

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Physical Connection

- The n-BMS CREATOR license is supplied as a "Softkey" that contains both licence key and the PC software
- The softkey is locked to a licensed PC.
- Along with the CREATOR license 5 hours of application support is offered free of charge (remote)
- The connection to the PC is done with a PeakCAN adapter:

System overview

BMS Creator™

1. MCU
2.1 CMU 1
2.2 CMU 2
3. BATTRY PACK
4. SHUNT/HAL
5. CHARGE CONTACTOR
6. HV- MAIN CONTACTOR
7. HV+ MAIN CONTACTOR
8. PRE CHARGE CONTACTOR
9. CHARGER (CAN or PWM)
10. CAN DISPLAY
11. DIAGNOSTIC TOOL

HV +
HV −
CELL MONITORING
TEMPERATURE MONITORING
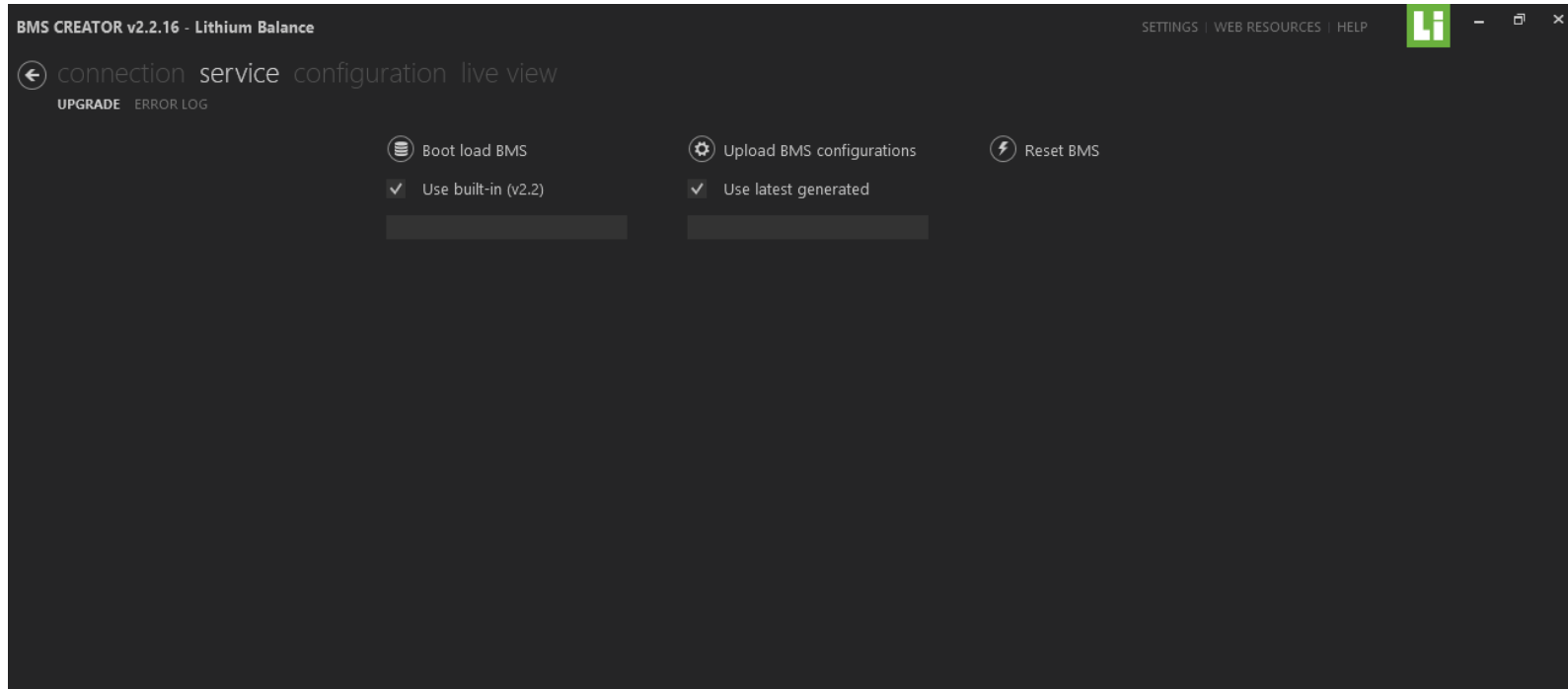CAN 1
CAN 2
INPUT SIGNALS
OUTPUT SIGNALS
KEY SWITCH

6-34V

VCU

Resistor

80 % SoC
80 % SoC
80 % SoC
80 % SoC
80 % SoC
80 % SoC
80 % SoC
80 % SoC
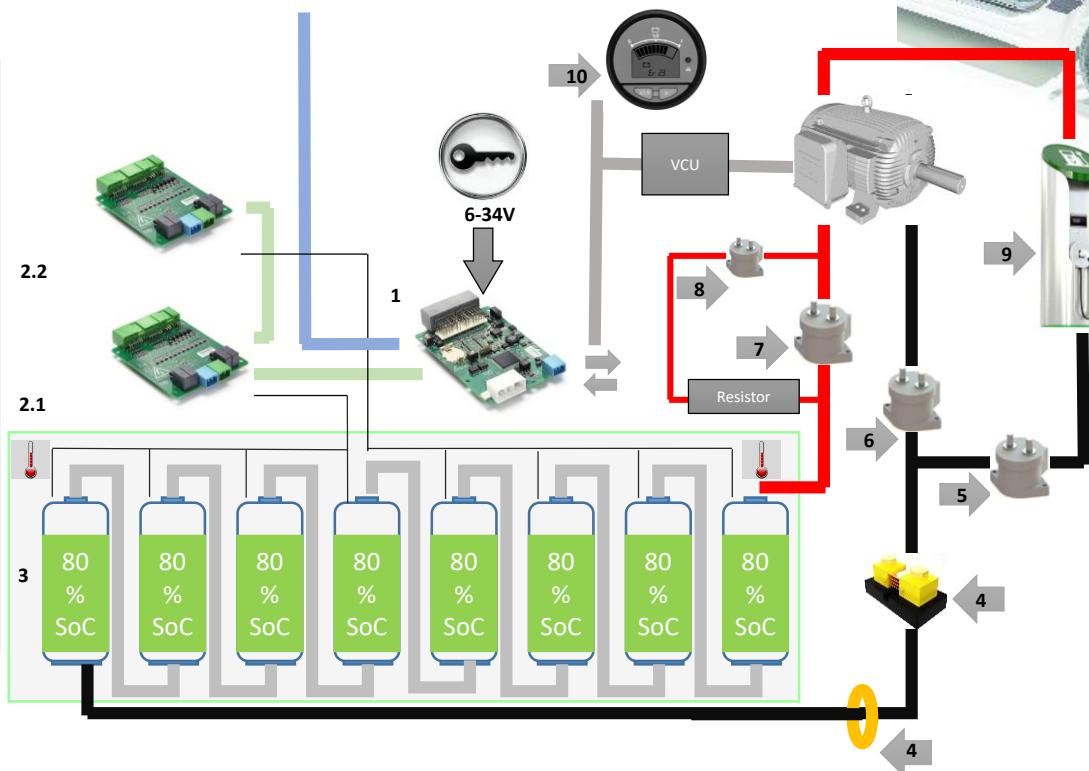
Communication Connection
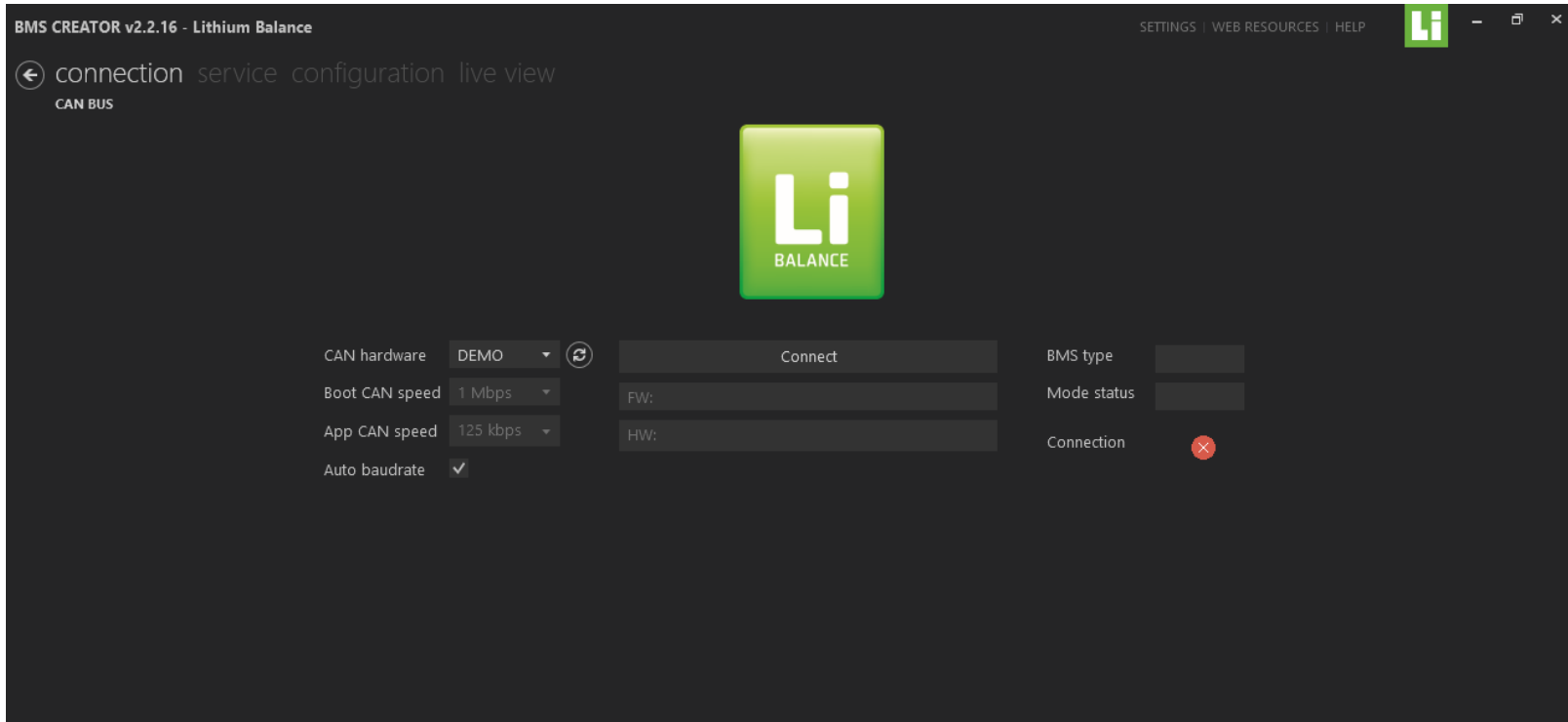
The battery designer is able to:
- Connect/Disconnect the BMS from the PC.
- Check the type of BMS connected, its Hardware serial number & the firmware version.
- Possible to check the connection status of the BMS & PC

Service

The battery designer is able to
- Bootload the BMS with proper Bootloading files. This is useful while upgrading to new versions of software.
- Upload previously saved BMS configuration file onto the BMS.
- Reset the BMS
- Read and save error logs.

Configuration
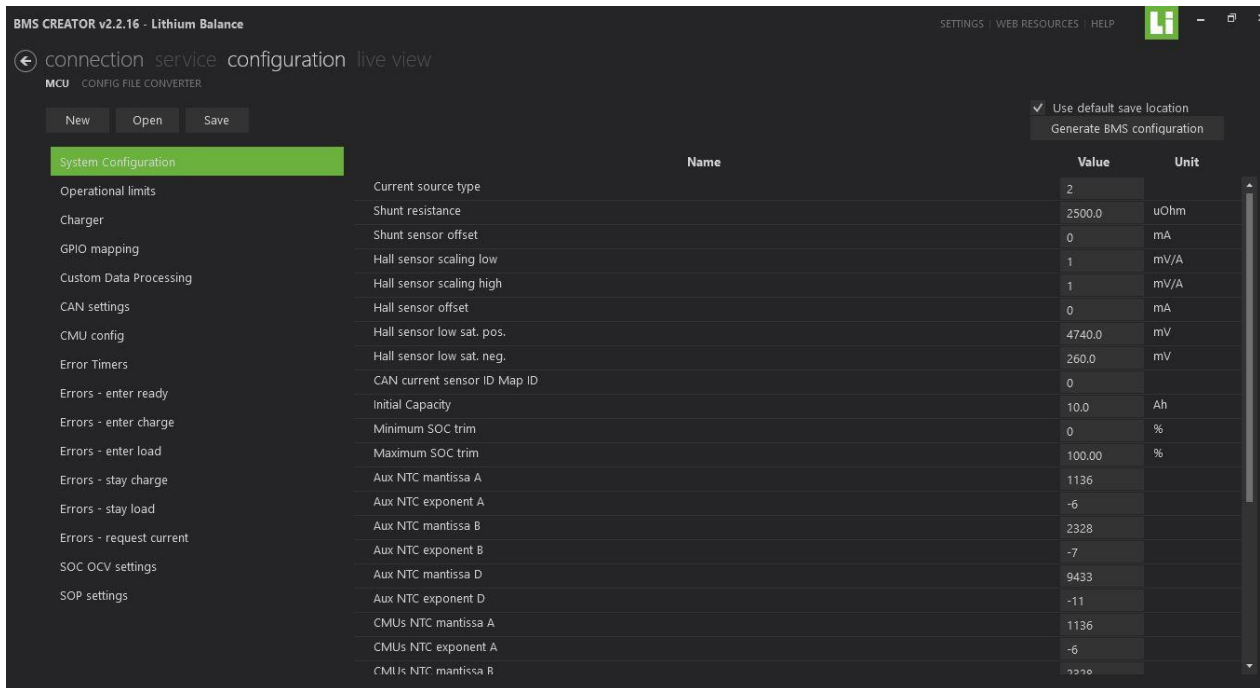
In Configuration tab it is able to
- Select new configuration.
- Open previously saved configuration & Save current configuration.
- Convert the old version configuration file into the new version which is compatible with the current software version.
- Generate BMS configuration which can be then written onto the BMS.

The configuration page enables the user to completely configure the BMS.

System Configuration

In System configuration tab it is possible to
- Configure Current sensor type and its value. The n-BMS supports 2 current sensor types
  1. Shunt Resistor
  2. Hall Effect Sensor
- Calibrate the sensor as required
- Configure Pack capacity
- SOC Trimming
- Calibrate the Auxiliary Temperature sensor & also the PCB temperature values.
- Calibrate the SOH SOC

Operational Limits

Operational limits can be configured:

- Configure the voltage thresholds for the cell like Min. & Max. cell voltage thresholds.
- Configure the temperature thresholds for the cell like Min. & Max. cell temperature thresholds.
- Configure Contactor settings like max. Contactor break current & Max. precharge end current etc. for proper & safe operation of the contactor.
- Configure the number of temperature sensors required & min. & max. values for each temperature channel.
- Configure the amount current allowed in & out of the system depending on the temperature & SOC values
- Configure balancing thresholds

Charger configuration

In the Charger tab it is possible to configure
- Charge complete dead bands which will allow BMS to know whether the charging is complete.
- Select whether the charger is CAN or PWM charger.
- For PWM charger, it allows to configure the Min & Max duty cycles etc.
- Set Max. Charge voltage, Current & Cell max. voltage
- Set the control system parameters like Kp, Ki & Kd.

GPIO Mapping

Name	Value	Unit
Request load active	1	IO
Request charge active	2	IO
Request combined active	0	IO
Load negative feedback	0	IO
Precharge feedback	0	IO
Charge negative feedback	0	IO
Load positive feedback	4	IO
Load negative	6	IO
Precharge	0	IO
Charge negative	7	IO
Load positive	5	IO
Activate sleep	0	IO
Activate balancing	3	IO

The contactors are the electromechanical switches, which potentially will isolate the battery pack.

These contactors are controlled by the BMS through a set of General purpose input output ports called GPIOs.

The n-BMS supports 16 GPIOs

This window allows the user to configure the GPIO settings as required.

Custom Data Processing

The custom data processor, also known as post processor allows the data that is received in either RAW form or in some other form to be converted to a usable format that can be directly passed to other systems. This includes maths functions like ADD, SUB, MUL & DIV and also logical functions like AND, OR, NOT etc.
It also helps to scale the data to the right format & value.

Here the user is able to
- Configure the left side value type and its value
- Configure the right side value type and its value
- Select the operator.
- It allows this data to be used on CAN

CAN configuration
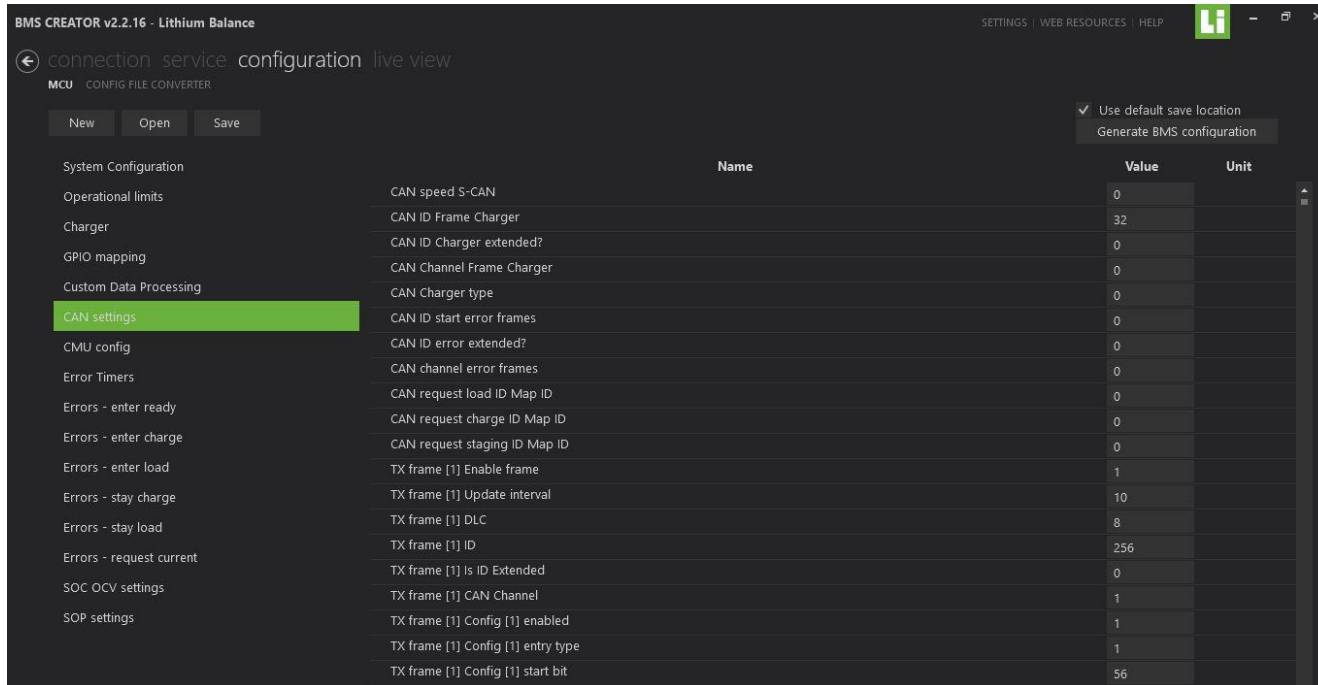
- The n-BMS offers completely configurable CAN.
- It supports both standard & extended i.e. 11-bit & 29-bit CAN messages.
- It has 20 Transmit (Tx) & Receive (Rx) frames each containing 10 messages. This allows most of the data to be configured.
- The n-BMS creator v2.2 also allows CAN based charge & discharge commands which can enable automatic mode changing of the BMS.

CMU Configuration
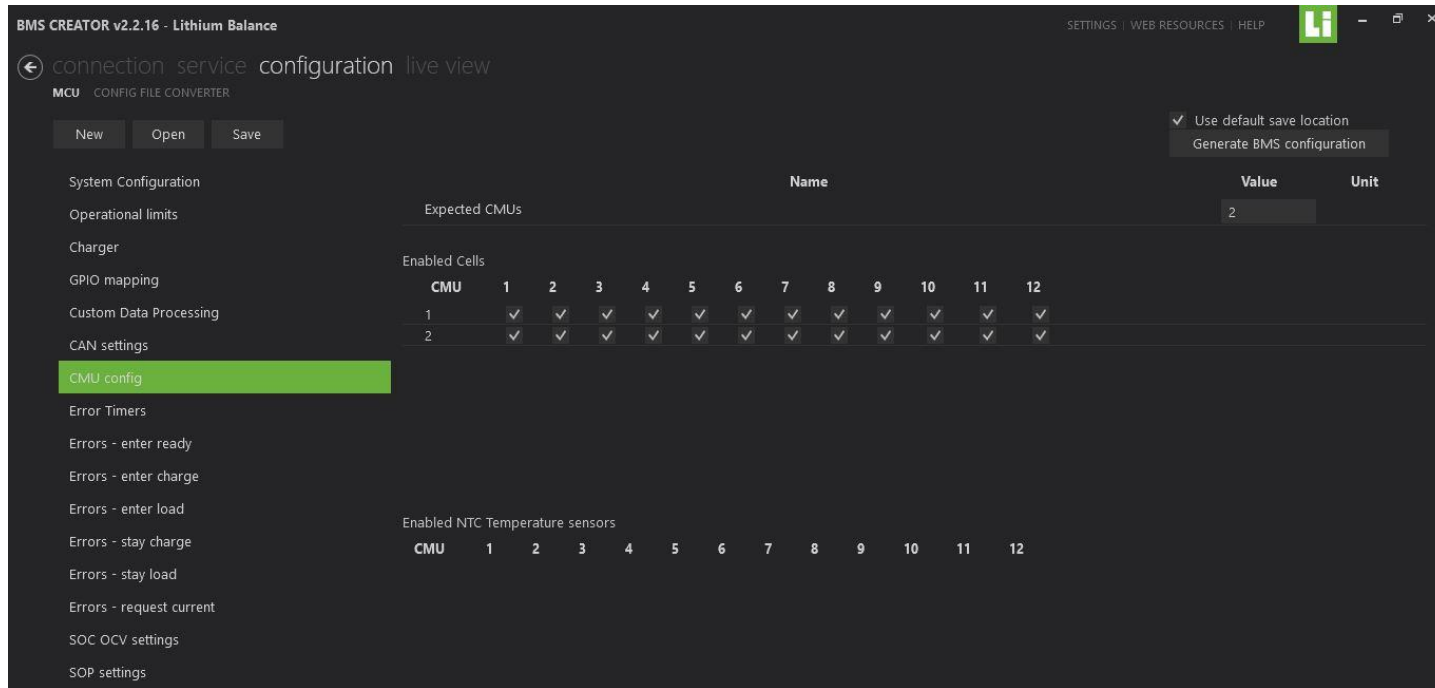
This window allows the user to
- Select number of slave boards called cell monitoring units (CMU)
- Select the number of cells connected to each CMU.

Error Timers

Here the user is able to
- Set the time the BMS will wait before showing any alarm if there is any error in the system like, Over current IN/OUT, Balancing alarms etc.

Error handling per BMS mode

- The purpose of these windows is to set the priority of each error that occurs in each mode like entering into Ready, charge or Load mode or in staying in these modes
- Every operation in the BMS is associated with an error code & once that error occurs, the BMS checks the priority against that error code
- Depending on the priority, the BMS takes suitable actions like just popping up to error or else completely disconnect the battery pack.

SOC OCV Settings

- This window allows the user to correct the SOC of the battery pack depending on the open circuit voltage (OCV) values
- These values are either supplied by the cell manufacturer or else the user needs to extrapolate these values
- The more the number of values the more accurate will be the SOC estimation.
- The software offers 100 datasets of voltages for a given temperature value depending on which the SOC is calcucated.

Live View
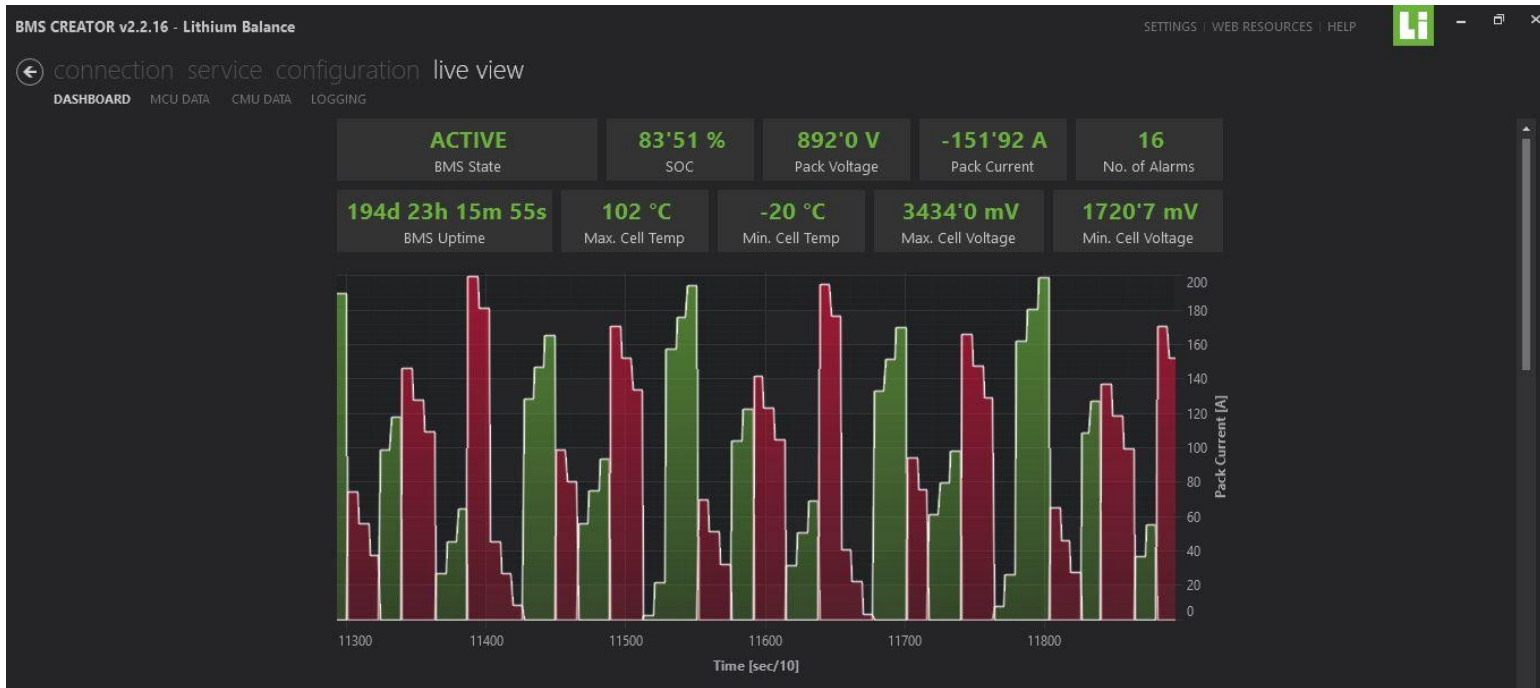
This window shows the complete overview of the system status and parameters like
- BMS state
- SOC, Pack voltage, Pack Current, Number of alarms, BMS uptime, Cell Min./Max. temperature & voltages
- This also shows the graph of Charging & discharging current, Min/max cell voltage & Temperature, SOC Vs Time

Master controller Unit (MCU) Data

This window shows
- GPIO status
- Temperature data
- Current values
- The errors that are present in the system

Cell Monitoring Unit (CMU) Data

The User is able to see all the cell voltage values in real time
As well as pack temperature values in real time

Logging
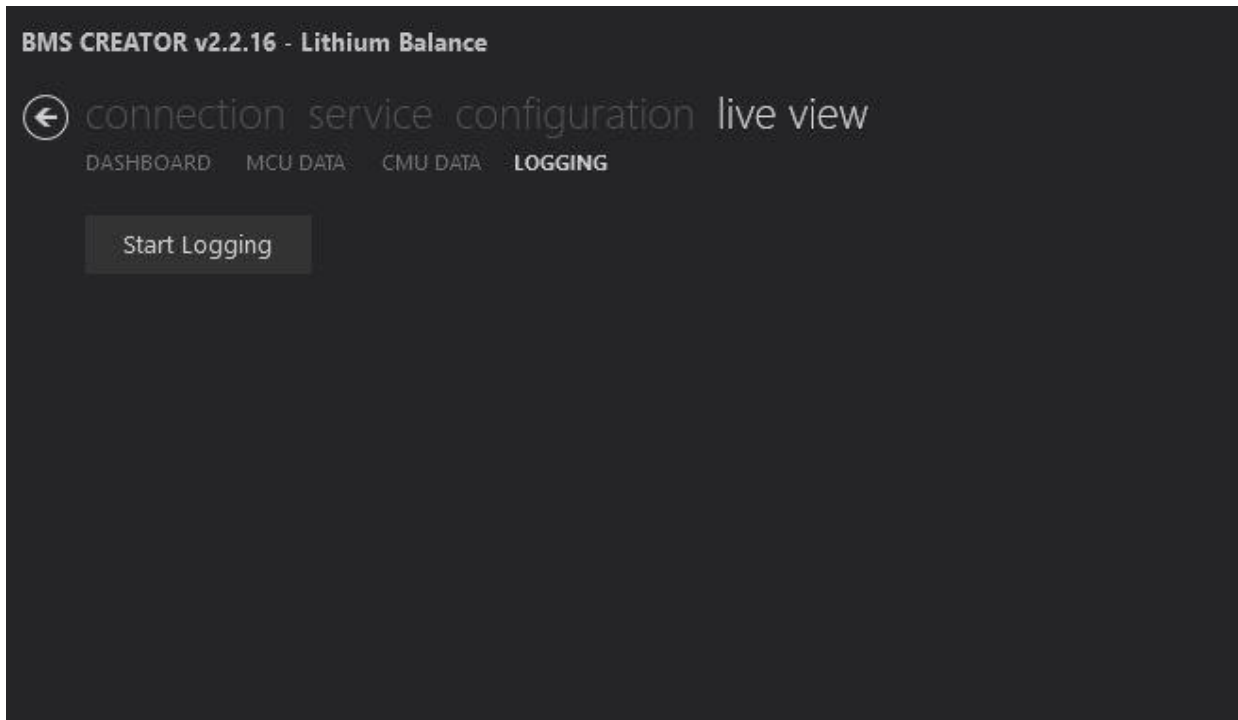
There the user can take a log of what is currently going on in the system & then use that data for fault analysis.

Thank You!