AN5560

Application note

L9963 14 Cells BMC IC Evaluation Board

Introduction

This document is intended as quick guide to help the user in the startup phase of EVAL-L9963-MCU combining and summarizing the information contained in EVAL-L9963-MCU and STSW-L9963 user manuals.

1 What you need

- EVAL-L9963-MCU
- USB cable
- Power supply (at least 3 output 0 – 30 V (if possible 60V):
  - 1 output to power L9963 (0:60 V)
  - 1 output to simulate Cells common mode voltage (0:60 V)
  - 1 output to simulate Cell voltage (0:5 V)
- L9963 evaluation GUI STSW-L9963
- NI Labview-runtime 2014
- NI VISA-RUNTIME

Note: Before using the UART/USB bridge FT2232H, the Virtual Com Port (VCP D2XX) driver needs to be installed. It can be downloaded by the FTDI Chip website.

Figure 1. EVAL-L9963-MCU board

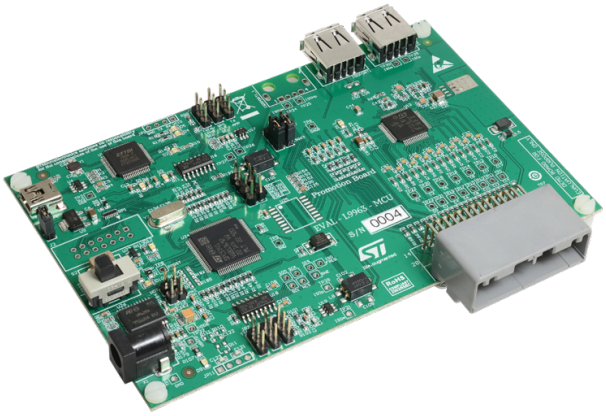
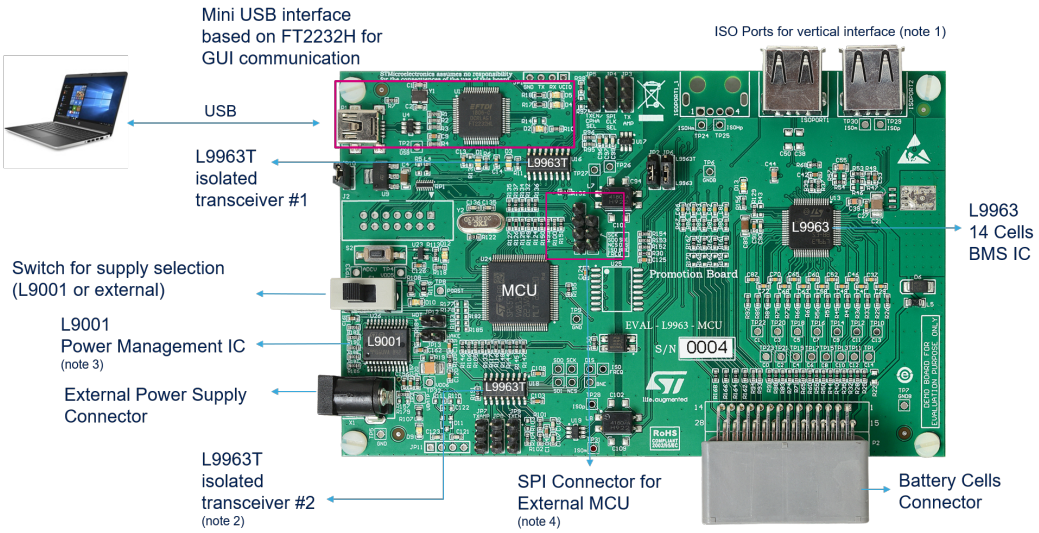


Figure 2. EVAL-L9963-NDS board

2 Board description

Figure 3. Main components and connectors

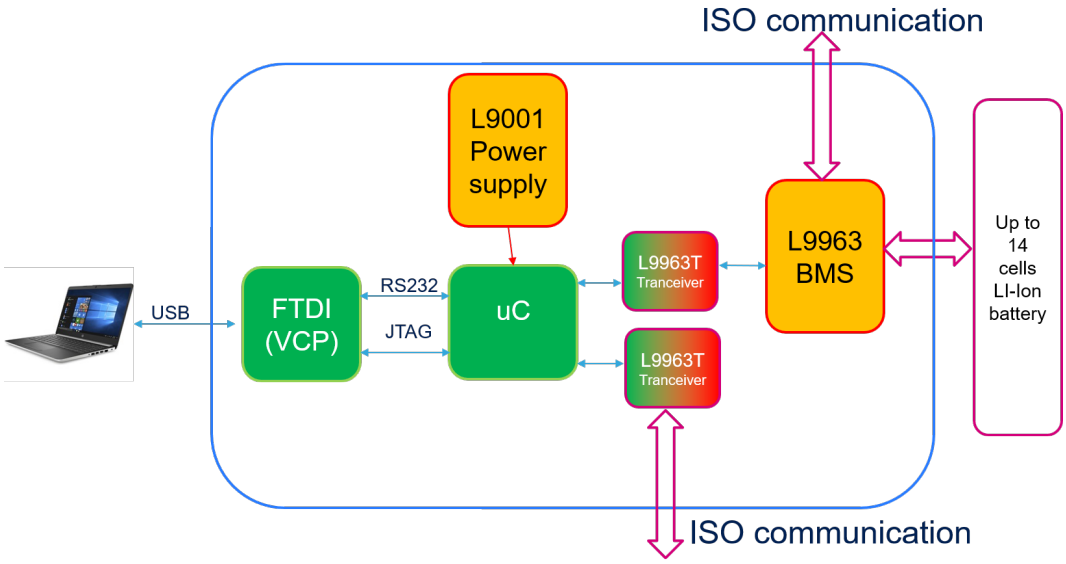


Note:

1. *EVAL-L9963-MCU can be considered the only stage or the first stage of several stages. The port is the isolated vertical interface to the next stage (EVAL-L9963-NDS);*
2. *A second L9963T (optional) may be needed to create a direct loop with the last stage (dual ring access);*
3. *MCU can be supplied either by USB or by L9001 (PMIC);*
4. *On board MCU can be bypassed in case a different MCU is needed for the user trials; these pins allow an SPI connection with an external MCU (upon a specific board configuration). Anyway a specific board derivative of EVAL-L9963-MCU has been designed for this purpose (same form factor/layout with MCU not mounted: EVAL- L9963).*

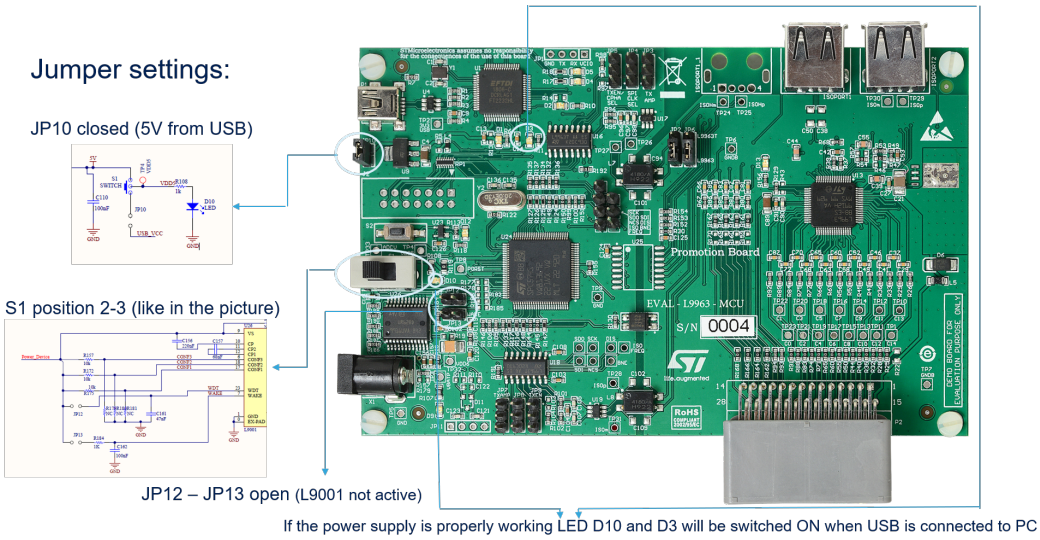
3 Block diagram

Figure 4. **EVAL-L9963-MCU block diagram**



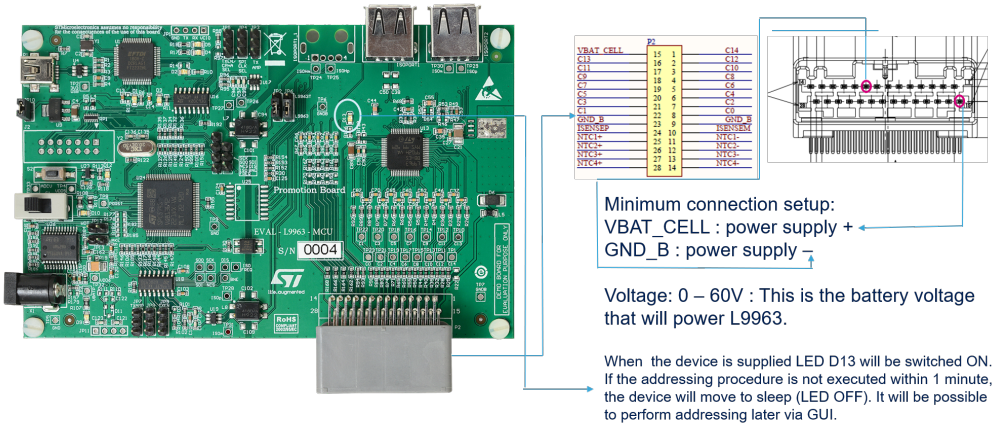
4 Microcontroller Power supply

Figure 5. **Microcontroller Power supply**



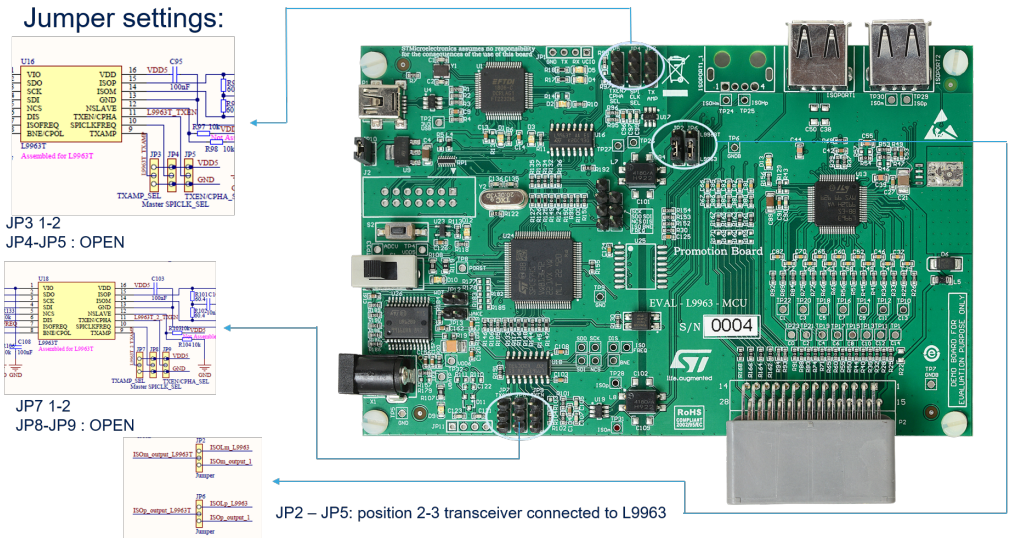
5 L9963 external connection and power supply

Figure 6. **L9963 external connection and power supply**



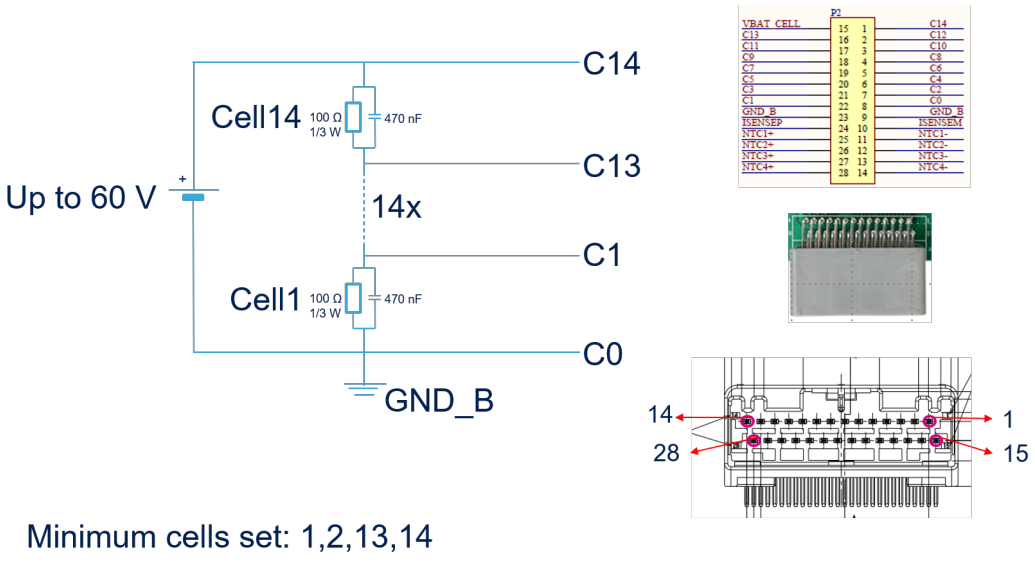
6 Transceiver settings

Figure 7. **Transceiver settings**



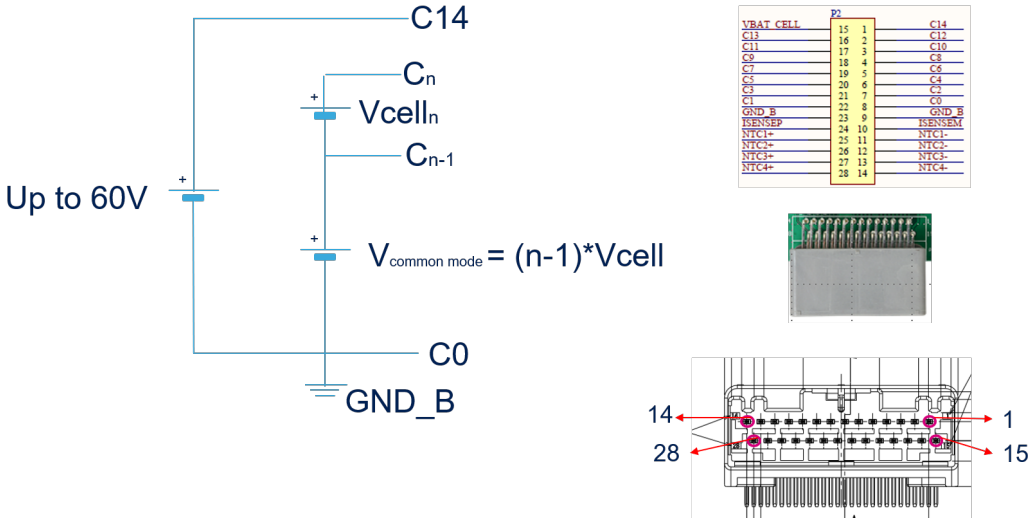
7 Possible connection for battery simulation

Figure 8. **Battery simulation 1**



Minimum cells set: 1,2,13,14

Figure 9. **Battery simulation 2**



8 Preliminary action to open the GUI

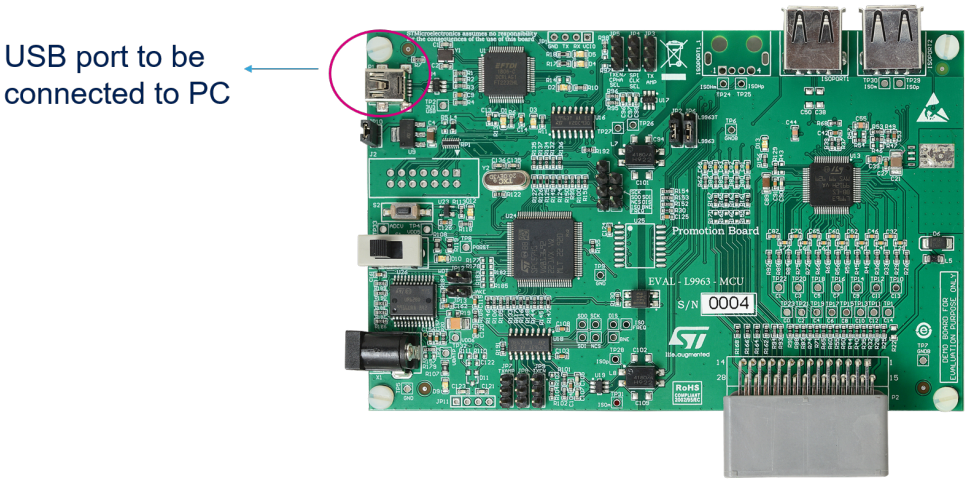
Install the following SW on your PC:

- NI Labview-runtime 2014
- NI VISA-RUNTIME
- FTDI driver
  - Before using the UART/USB bridge FT2232H, the Virtual Com Port (VCP) driver needs to be installed. It can be downloaded by the FTDI Chip website.

When all is installed reboot your PC and open STSW-L9963.exe

9 USB to PC connection

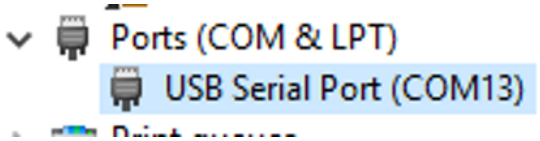
Figure 10. **USB to PC connection**



10 Device Manager appearance

If FTDI Virtual COM PORT (VCP D2XX) driver has been correctly installed, you will find in Windows Device manager a USB serial port under Ports (COM&LPT). Take note of the COM port number (i.e. COM13).

Figure 11. Windows Device Manger COM port number



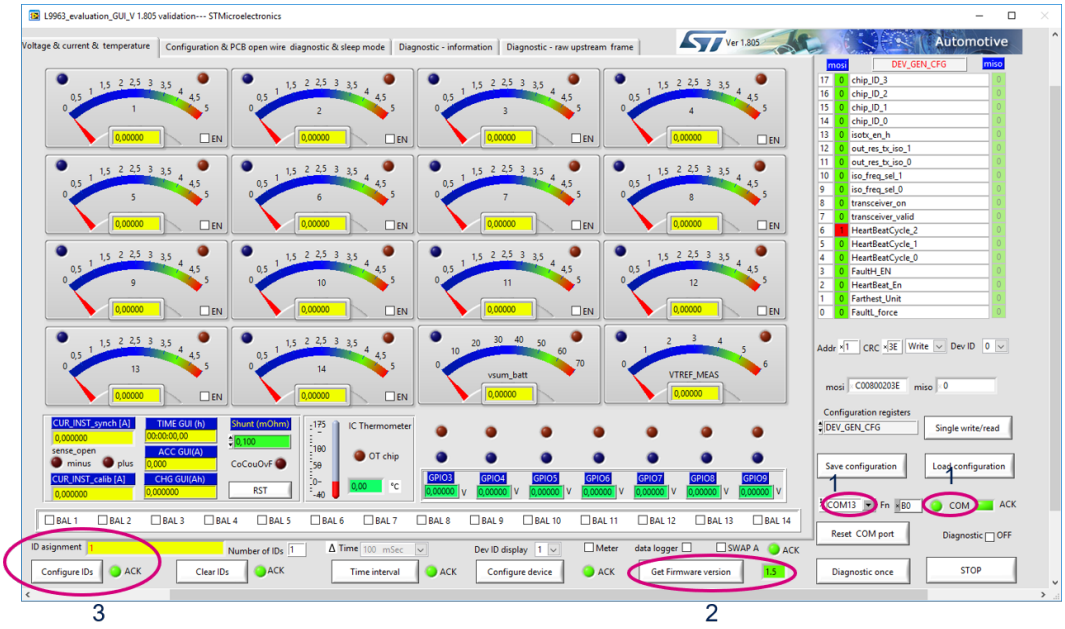
11 GUI usage and setup

11.1 Connection

Steps:

1. Select COM port according to your device manager. The COM led will become green;
2. Press on “get firmware version” button to check the communication with uC and the firmware version. The version should be 1.5;
3. In the “ID assignment” text box write 1 because you are using 1 L9963 then press “Configure IDs Button”, ACK LED will become green. If D13 LED on the board was switched OFF it will be switched ON and will not switch OFF anymore.

Figure 12. GUI connection

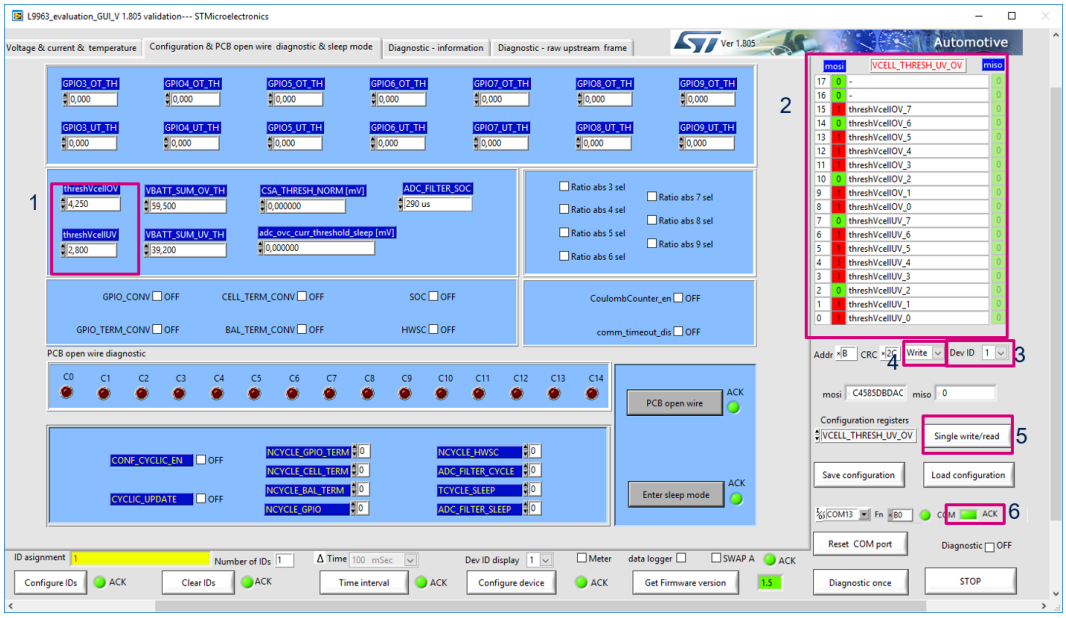


11.2 Threshold configuration

Steps:

1. Select Cell overvoltage and undervoltage. i.e. UV 2.8 V and OV 4.250 V;
2. The VCELL_THRESH_UV_OV register will be automatically updated;
3. Select Dev ID 1;
4. Select Write;
5. Press on “Single write/read” button;
6. If communication with L9963 is ok the ACK LED will become green.

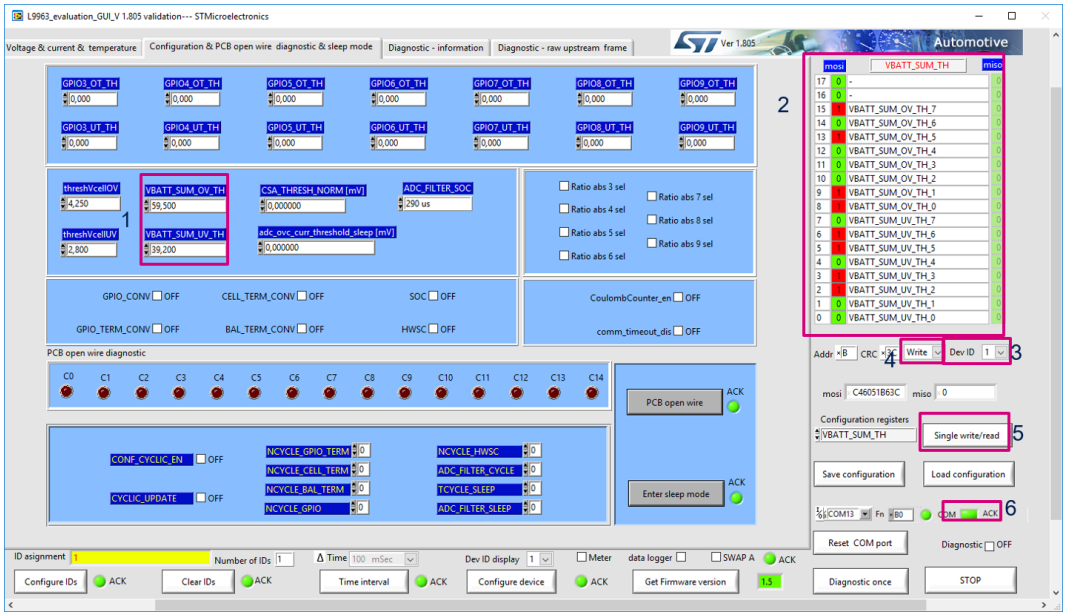
Figure 13. Threshold configuration 1



Steps:

1. Select Battery overvoltage and undervoltage. i.e. UV 39.2 V and OV 59.5 V;
2. The VBAT_SUM_TH register will be automatically updated;
3. Select Dev ID 1;
4. Select Write;
5. Press on “Single write/read” button;
6. If communication with L9963 is ok the ACK LED will become green.

Figure 14. Threshold configuration 2



11.3 Measure enabling

Steps:

1. Select cell voltage gauge with the EN check box. At least Cells 1, 2, 13, 14 must be selected;
2. The VCELLS_EN register will be automatically updated;
3. Select Dev ID 1;
4. Select Write;
5. Press on “Single write/read” button;
6. If communication with L9963 it’s ok the ACK LED will become green.

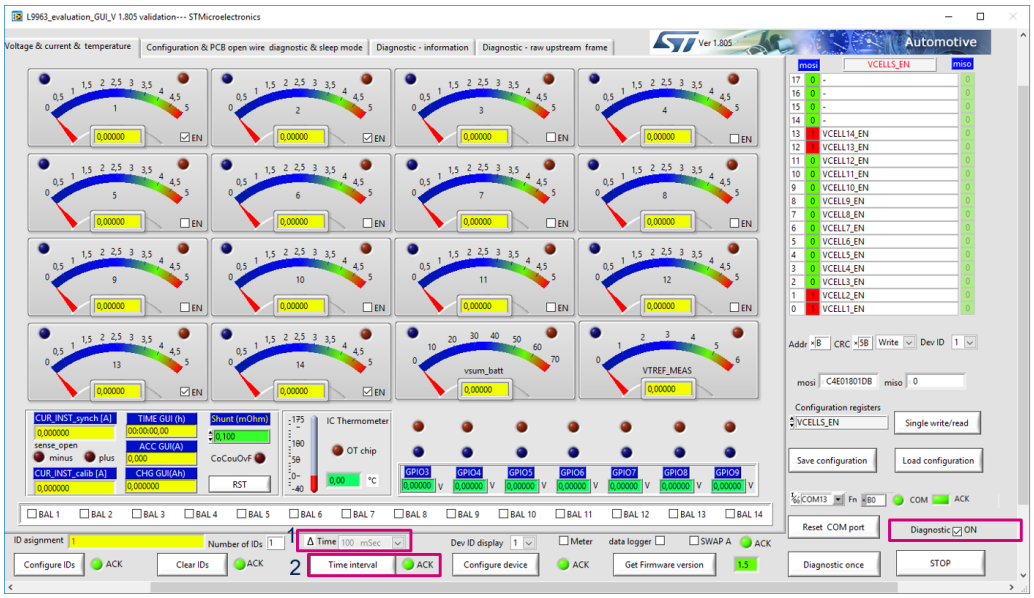
Figure 15. Measure enabling

11.4 Measure starting

Steps:

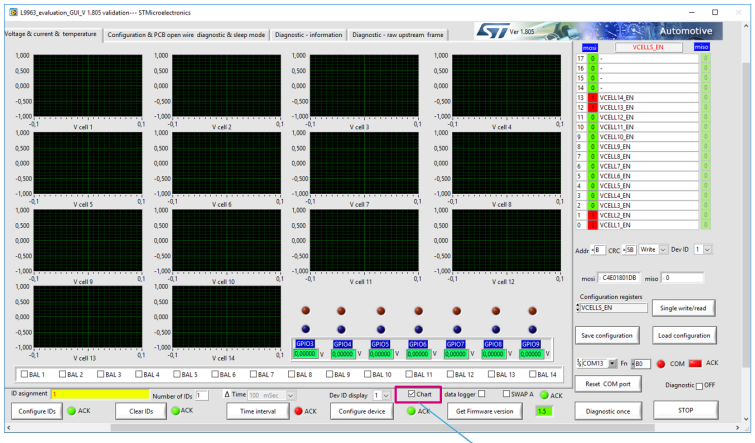
1. Select time interval. i.e. 100 ms. This is the refresh rate of GUI measurement;
2. Press on “Time interval” button to apply setting. ACK LED will become green;
3. Check Diagnostic checkbox to start measurement.

Figure 16. Measure starting



11.5 Alternative measure setting

Figure 17. **Alternative measure setting**



11.6 Measurements example

Figure 18. **Setup**

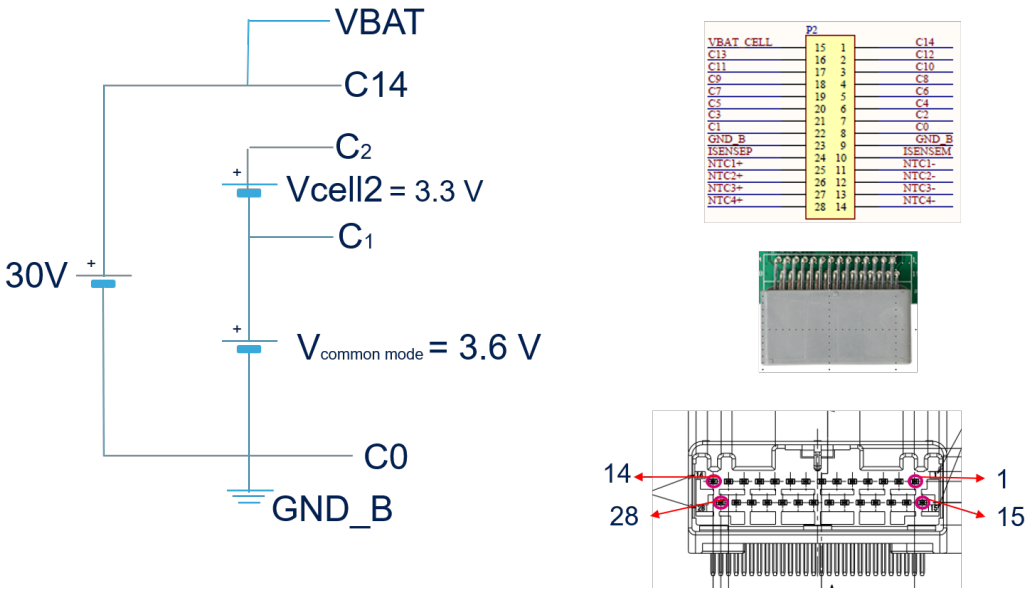
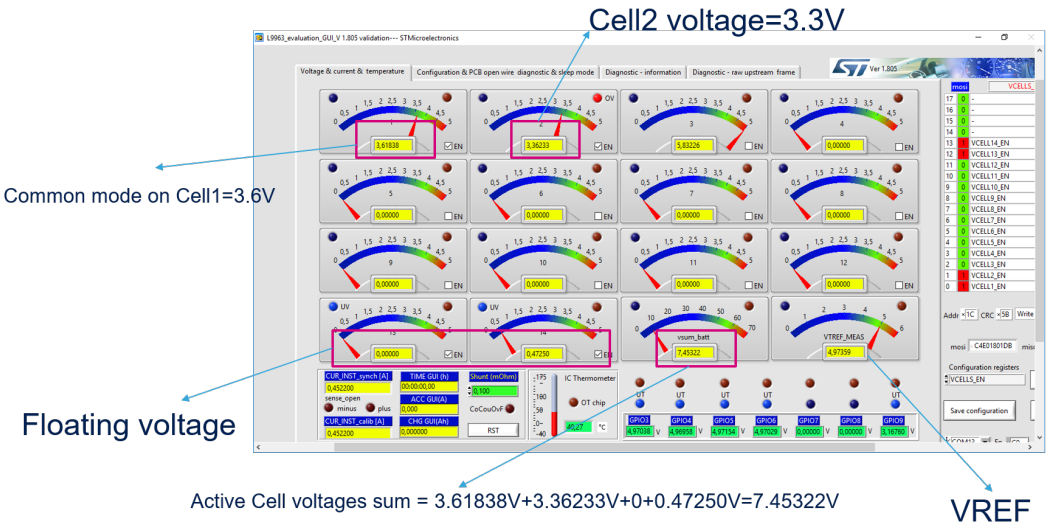


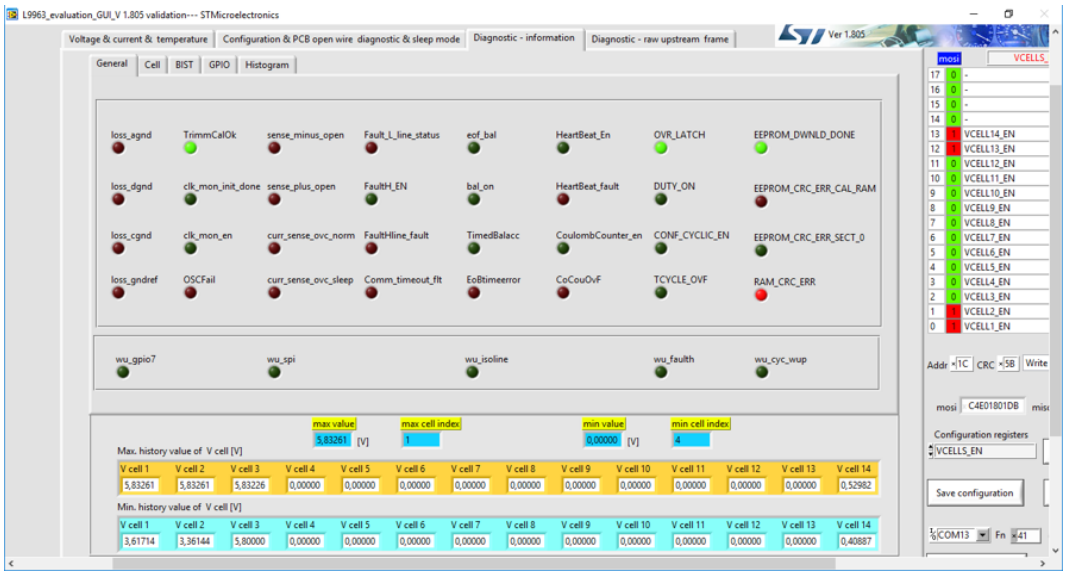
Figure 19. **Results**



11.7 Diagnostic

All the diagnostics are available in the Diagnostic-Information tab. They are updated at the same rate as measurement.

Figure 20. Diagnostic



Appendix A Reference documents

Table 1. **Reference documents**

Doc Name	ID	Title
UM2698	034111	EVAL-L9963-MCU Evaluation Board
UM2734	034356	L9963 evaluation graphical user interface

Revision history

Table 2. **Document revision history**

Date	Version	Changes
15-Sep-2020	1	Initial release.

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