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**Title : [ADES183x\_EVKIT] Customer Evaluation Board Test Procedure**

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**EVAL-ADES183x Test Plan - PRELIMINARY**

**User Manual**

**Analog Device**

July 2023

**USER'S MANUAL**

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# 1.0 GENERAL INFORMATION

## 1.1 System Overview

The EV-ADES1830/31 is a Battery Monitoring board that is connected to a battery with the ability to read back the voltages and current running through the battery. For the sake of this test, the battery voltage is emulated by a power supply while the current is emulated by the Keithley SourceMeter sending a current to the CSENSE pins. The voltage and current can be measured using the BMS GUI, ensuring that the correct values are read and thus proving the functionality of the board. In this test procedure the aim is to read back the current at the CSENSE pins through the use of the GUI.

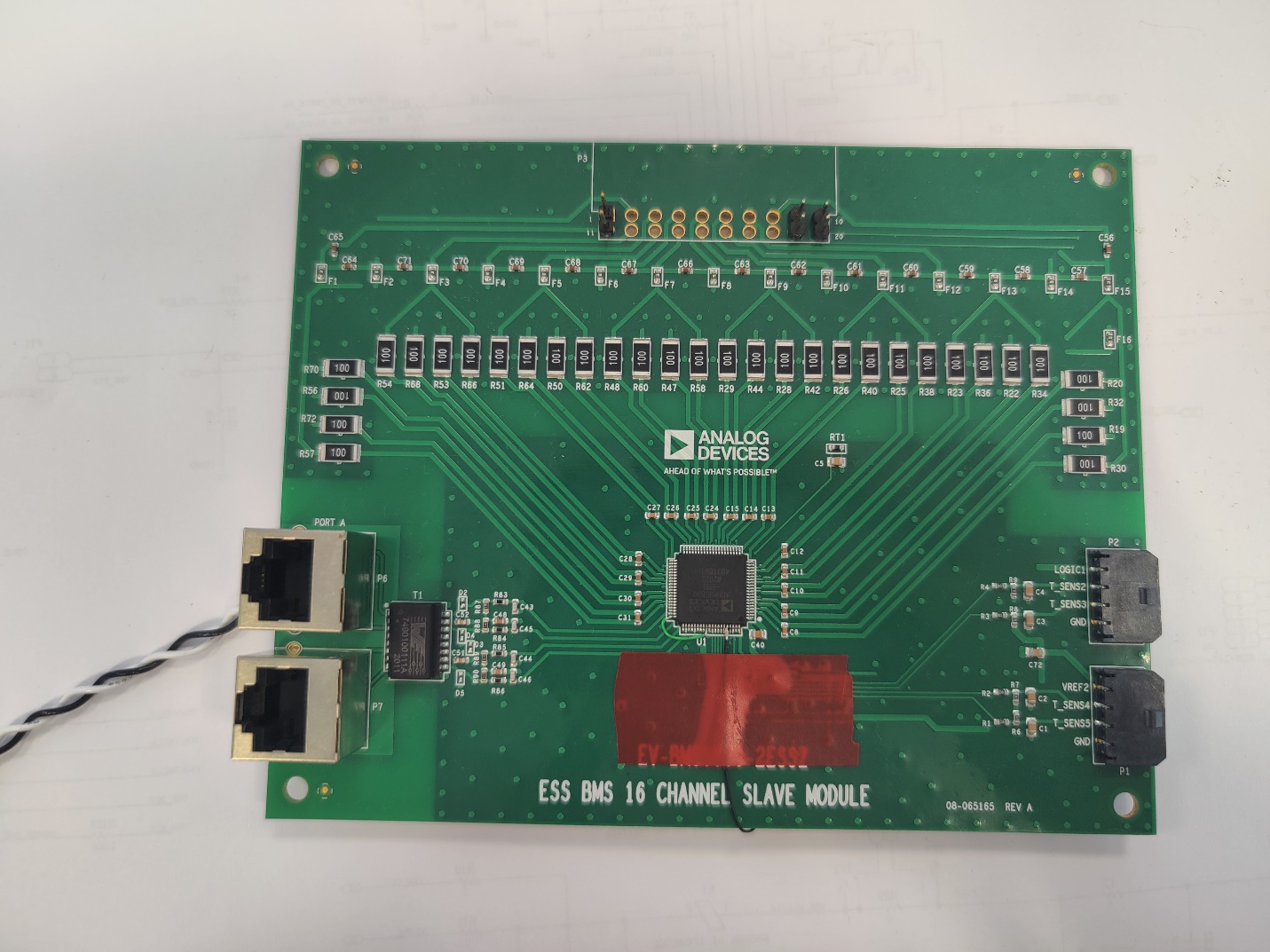


Figure 1: ADES1830 Evaluation Board

## 1.2 Acronyms and Abbreviations

Provide a list of the acronyms and abbreviations used in this document and the meaning of each.

BMS: Battery Management System

CSSENSE: Current Sense

EVKit: Evaluation Kit

GUI: Graphical User Interface

SDP: System Demonstration Platform

# 2.0 SYSTEM SUMMARY

## 2.1 System Configuration

The test setup is comprised of a hardware system, software drivers and a GUI. When combined they can be used to test whether the ADES1830/31 is functional and what current the board is reading from the power supply. The details pertaining to these parts will be detailed in the following sections.

## 2.2 Hardware Setup

The hardware requirements for carrying out this test include:

* ADES1830/31 evaluation board
* SDP-K1 board
* EVAL-ADBMS6822 Dual isoSPI Adapter
* Power Supply
* Keithley Source Meter
* USB to USB-C cable
* RJ45 to Duraclik cable
* 4x power supply cables

Setup for SDP-K1

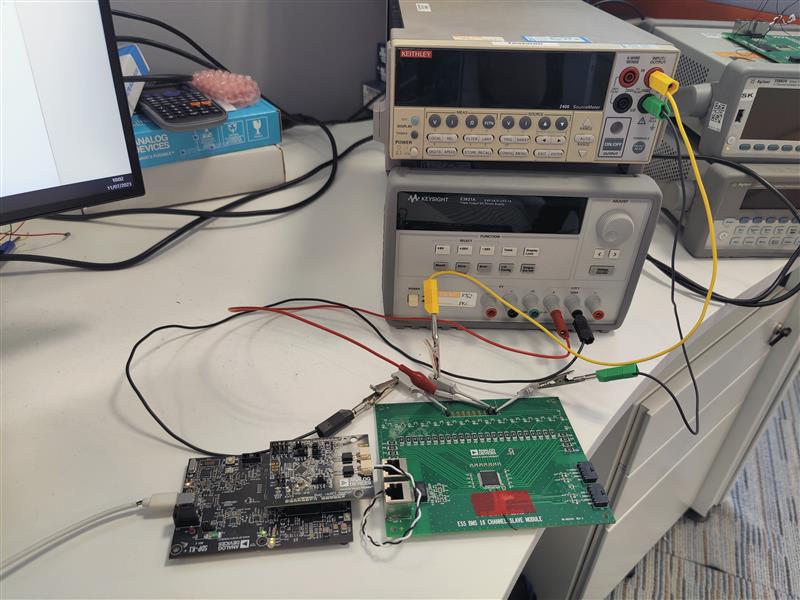
* Ensure header P14 is at 3.3V and not 1.8V
* Connect to laptop with the USB-C cable.

Setup for ADBMS6822

* Ensure JP1, 2, 3, 4 are all in position 1.
* Ensure JP9, 10 are in VDD position.
* Attach board to SDP-K1 via J3,4,5,6.

Setup of ADES1830/31

* Attach RJ45 end of cable to P6 on ADES1830/31 and Duraclik end to J1 on ADBMS6822.
* Connect positive cable of power supply to ADES1830/31 P3 pin 10 (BMS\_VP) and negative cable to pin 1 (GND).
* Connect positive cable of Keithley to ADES1830/31 P3 pin 9 (CSENSE\_P) and negative cable to pin 20 (CSENSE\_N).



ADES1830 Under Test

Keithley SourceMeter

0±25V Power Supply

SDP-K1 &

ADBMS6822

Figure 2: A complete hardware setup

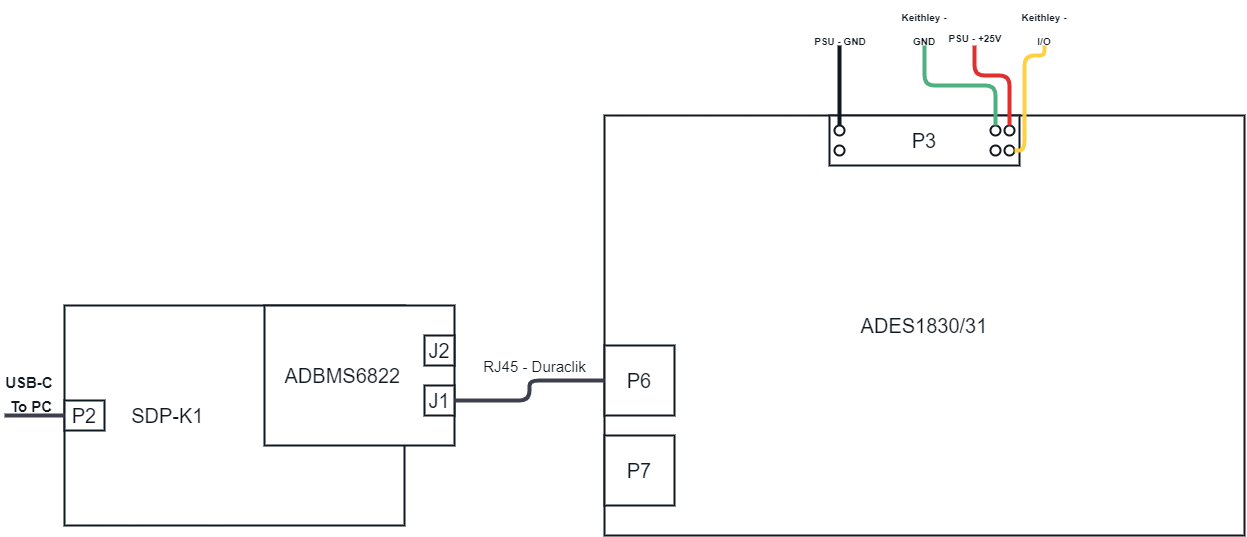


Figure 3: Diagram of hardware setup

## 2.3 SDP Software

To communicate with the SDP controller board, the driver install packages must be installed on the system. To download these, go to the [System Demonstration Platform (SDP)](https://confluence.analog.com/pages/viewpage.action?pageId=52664563&src=sidebar) page on Confluence. You may have to request access. Under the Software Reference Material and Downloads section, download the following files:

* SDPDrivers.exe
* SDPDriversNET40.exe
* sdpApi1.dll
* SDP\_K1\_1.16.0.3.hex

## 2.4 GUI Software

To use the BMS GUI, the related files must be downloaded from the [BMS Software Request Instructions](https://confluence.analog.com/display/BMSFS/BMS+Software+Request+Instructions) page. Submit a request ticket for the following software:

* BMS\_BROWSER\_GUI\_V1.3.0

If there are issues getting access please email [Joanna.patterson@analog.com](mailto:Joanna.patterson@analog.com).

Once the request has been approved, the software will be available to download from MyAnalog -> Resources -> Software Downloads.

It is suggested to move this folder onto the desktop and not be kept on the OneDrive.

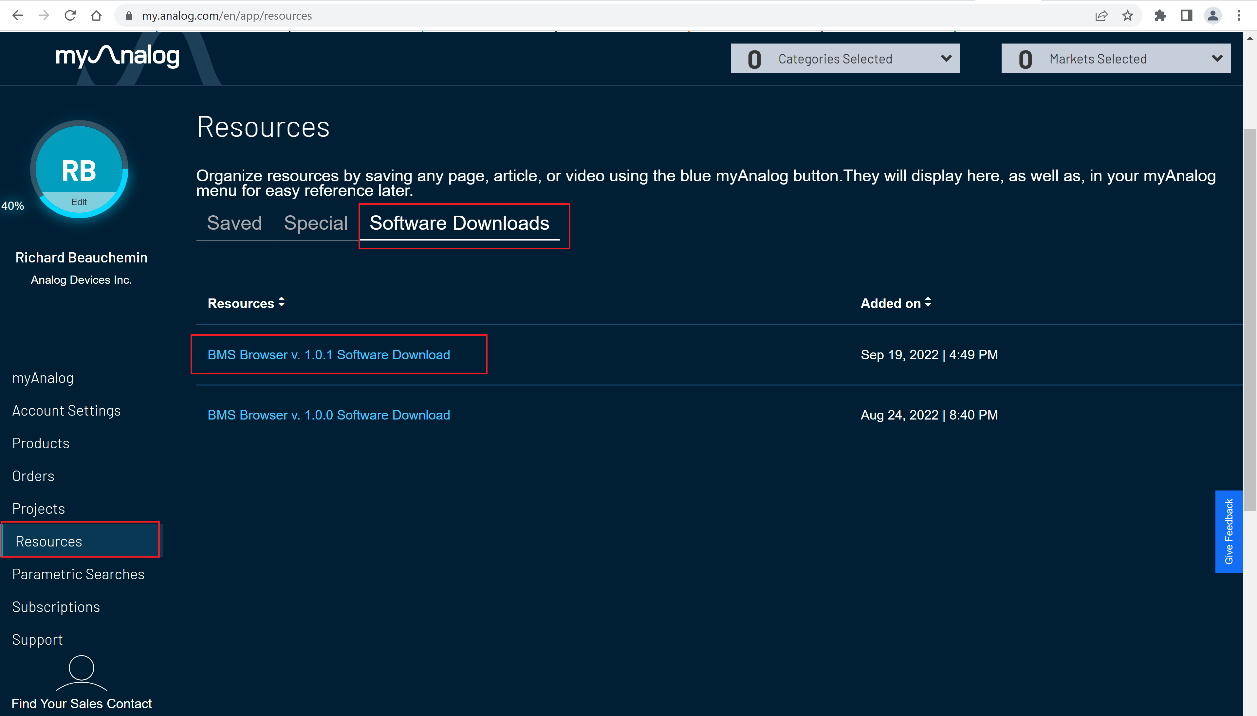


Figure 4: BMS Browser Software Location on MyAnalog

# 3.0 GETTING STARTED

All the setups should be complete at this point and the next step is to begin testing. The test involves applying a current to the CSENSE pins then reading back the correct value on the GUI. This proves that the ADES1830 is accurately measuring the current and that it can communicate properly with the controller SDP-K1 board.

## 3.1 Opening the GUI

Locate the BMS\_GUI.exe file. This can be done by following the location instructions below:

* BMS\_BROWSER\_GUI\_V1.3.0 folder
* BMS\_BROWSER\_GUI\_V1.3.0 folder within outer folder
* BMS\_BROWSER\_GUI\_V1.3.0.exe – Scroll to near the bottom.

Double click the .exe file to open the GUI. It will open as a set of two webpages. The first is the GUI, the second is the user guide explaining how to use the GUI.

Once open, the GUI will display the page shown below where the interface connection and board to be tested can be selected. If the SDP-K1 is already connected to the PC through the USB-C cable, then it should appear under the interface connection. If it doesn’t, open Device Manager and confirm that the board is being detected. There may have been an issue with the SDP drivers being installed. Next, under Generation, select ADBMSGEN6 and pick the ADBMS6830 (the board the ADES1830 is based on). Click the arrow to move it over to the right then click Launch.

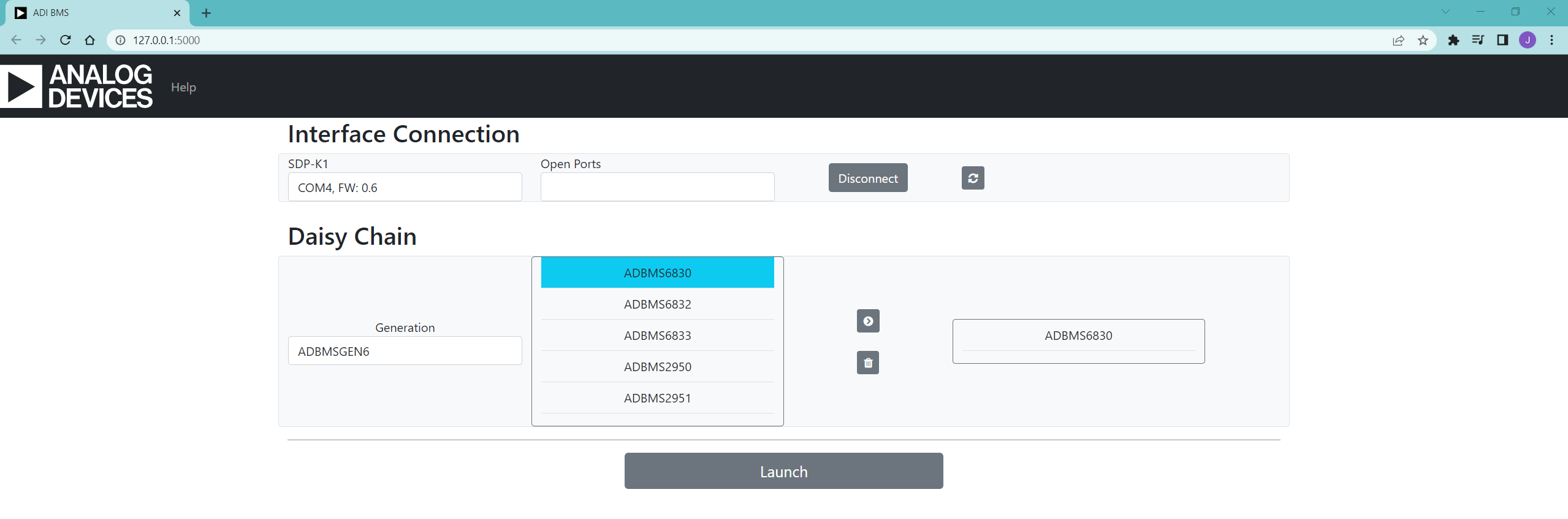


Figure 5: BMS GUI Opening Page

## 3.2 Measuring Current

On the GUI, after clicking Launch it will display the Quick Measure Utility page. This page has a graph for values being measured, configuration settings to add specific parts that need measuring and the memory map that describes each metric available for testing as well as the value being measured in real time.

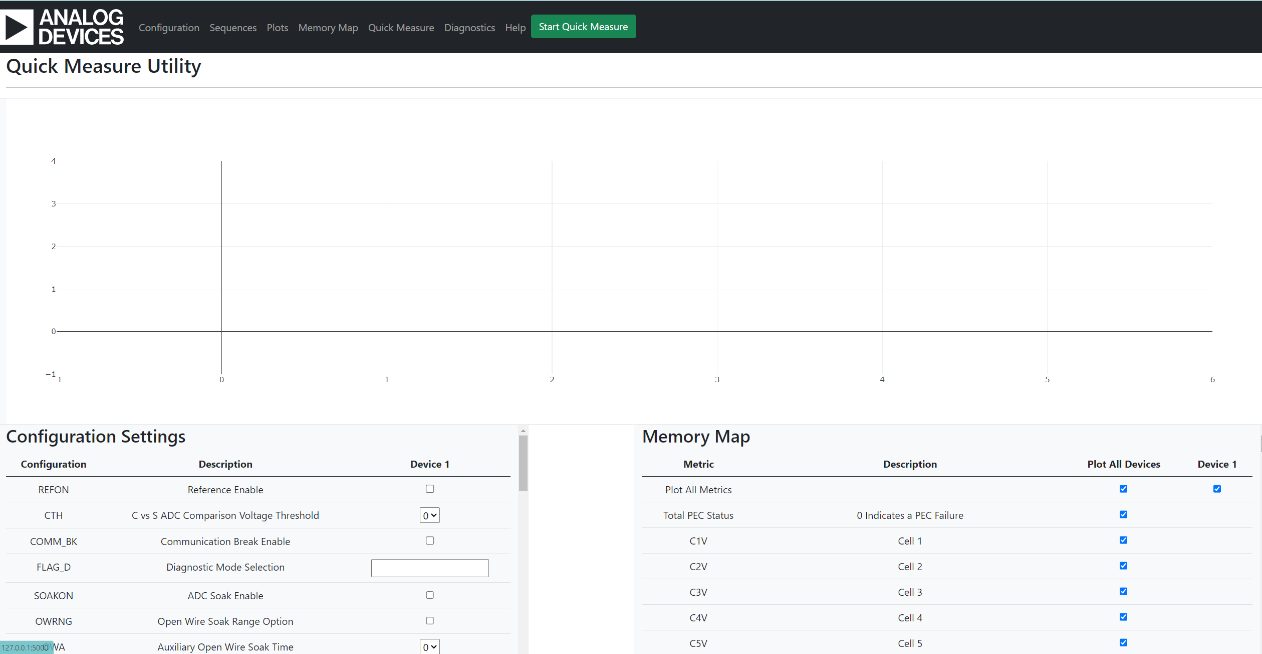


Figure 6: BMS GUI Quick Measure Utility Page

Turn on the power supply and Keithley to the values shown in the previous section. On the GUI’s configuration settings section, scroll down to GPO1 GPIO 1 Output State and tick the box to the right of it. Next, click Start Quick Measure to begin measuring values. On the Memory Map, scroll down until G1V GPIO1 Voltage Measurement is visible.

G1V should be sitting at ~3.03V while the rest of the GPIO measurements are ~0.006. The current amplifier has a gain of 50, therefore 10mV input with a gain of 50 gives 3V.

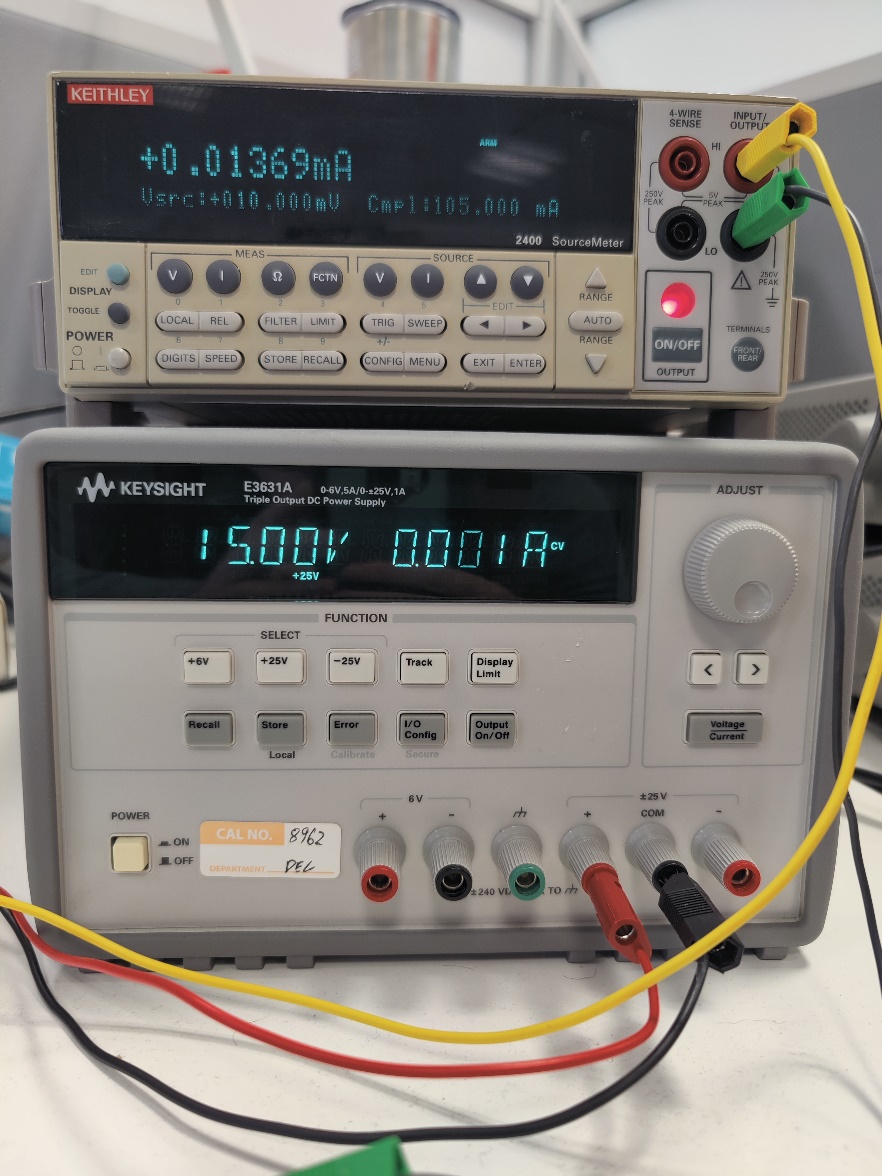


Figure 7: Power Supply and Keithley set to Test Values

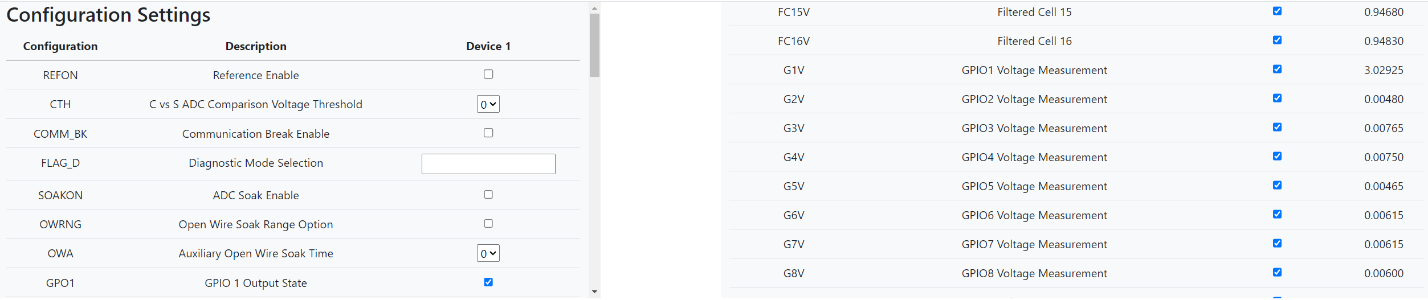


Figure 8: Current Measurement on BMS GUI

Sweep the input voltage on the Keithley from -80mV to 80mV in 10mV intervals, recording the results in an excel sheet like below. Use the gain calculation to work out the gain at each interval, confirming it is ~50. The board is accurate within the -50mV to 50mV range so ignore very off results outside that range.

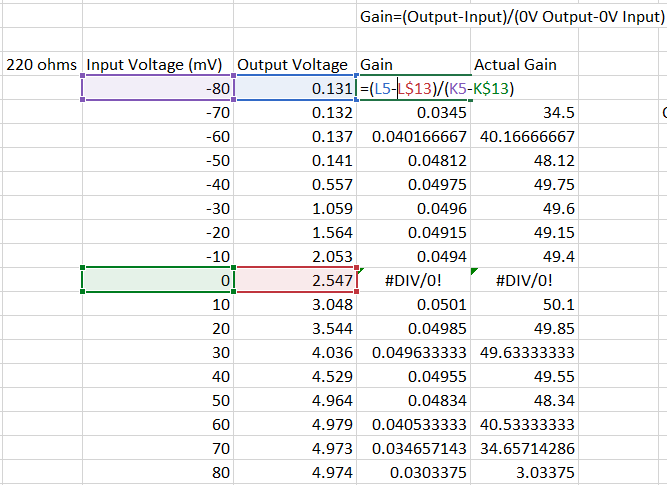


Figure 9: Excel sheet with Gain Calculation to check Current Measurement

If the results collected are similar to those shown above, then the test is a pass.

# 4.0 Common Error List

## 4.1 The BMS GUI is crashing or not opening correctly

When the GUI opens in the web browser it also opens a command prompt terminal that displays info on what is happening. For the most part this terminal can be ignored. However, it must be closed when the GUI is closed. This does not happen automatically; the user must click the red X to close it. There can only be one functioning version of the GUI open at one time.

## 4.2 Not seeing any significant value on the GPIO output

Make sure to have the GPIO1 ticked on the configuration settings section. If it isn’t ticked, then it will not show the value being measured.

## 4.3 BMS GUI not finding the SDP-K1 board

Open Device Manager and confirm that the board is being detected by the PC. If it isn’t, try a new cable or check that the drivers have been installed correctly.