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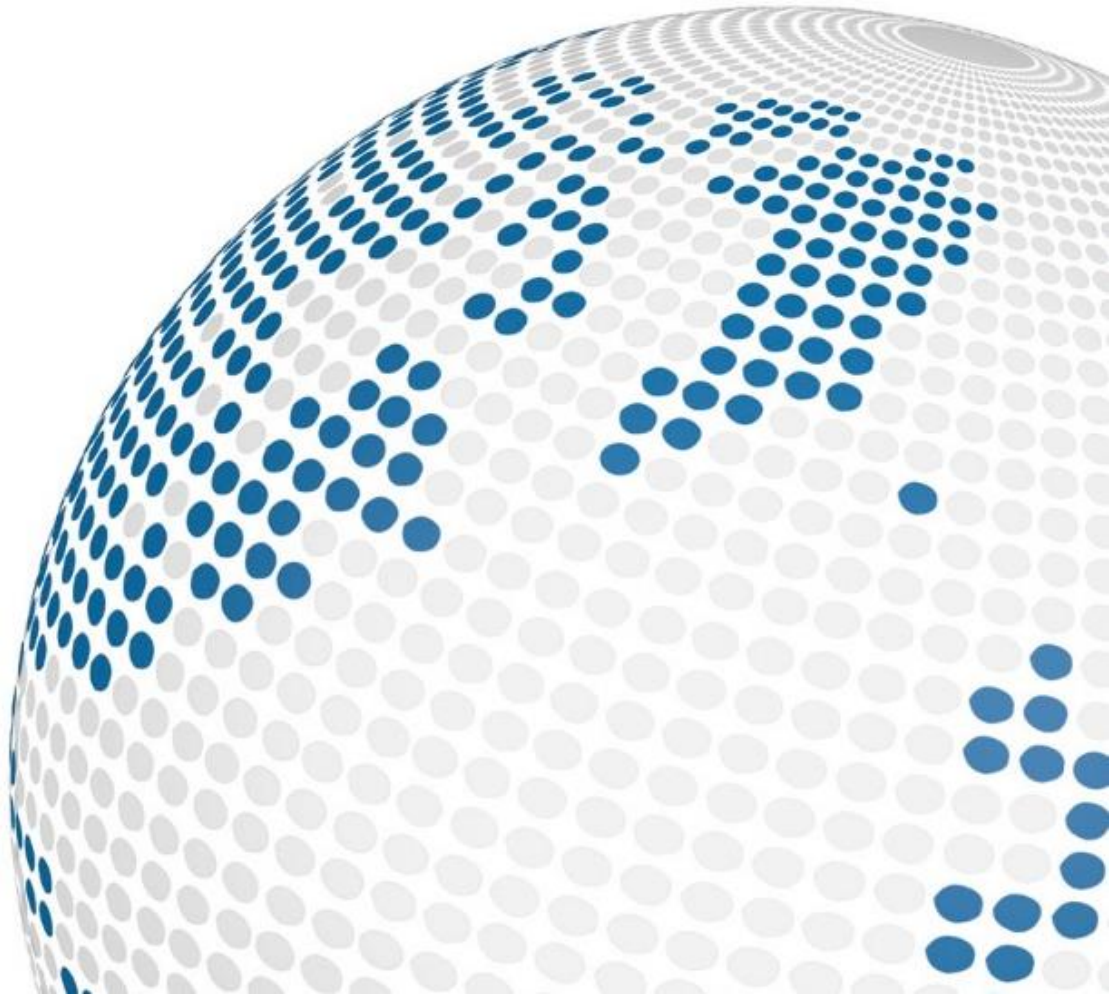
Shaping the world with sensor solutions

2020-09-01

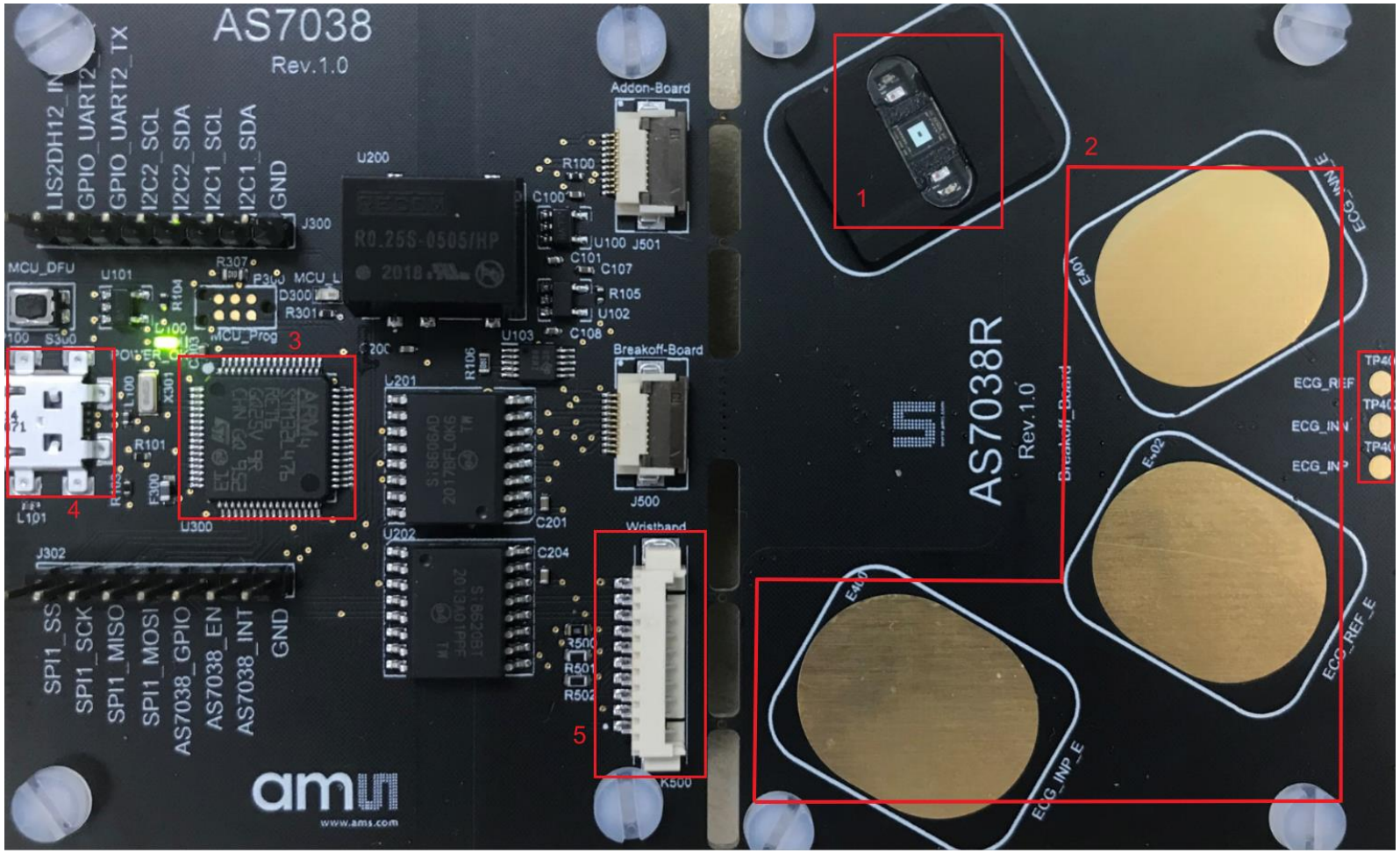


AS7038GB/AS7038RB Evalkit

User Guide

Contents of the AS7038GB/AS7038RB Evaluation kit

Evaluation kits main parts

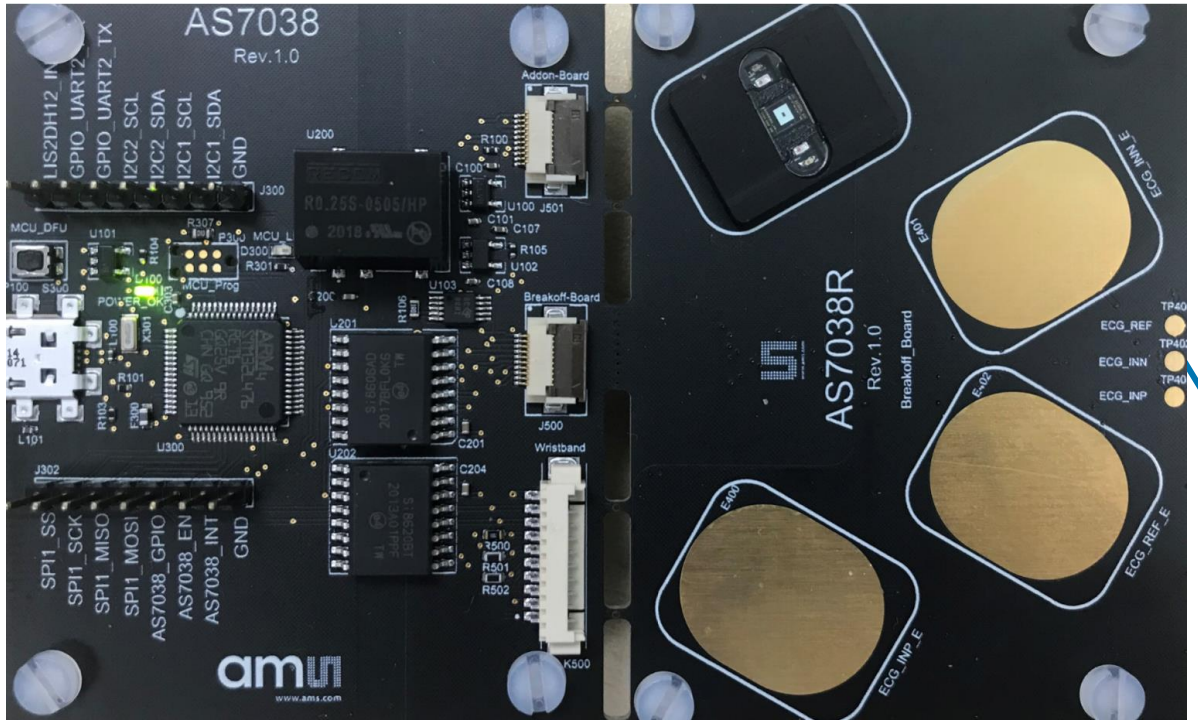


1. AS7038GB/AS7038RB* Sensor with LEDs
2. ECG electrodes pads
3. Microcontroller
4. USB connector
5. Connector to optional AS7038 Wristband

*Notes: This is a picture of showing AS7038RB only

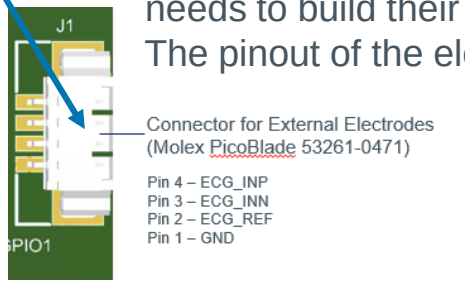
Setup

Getting Started



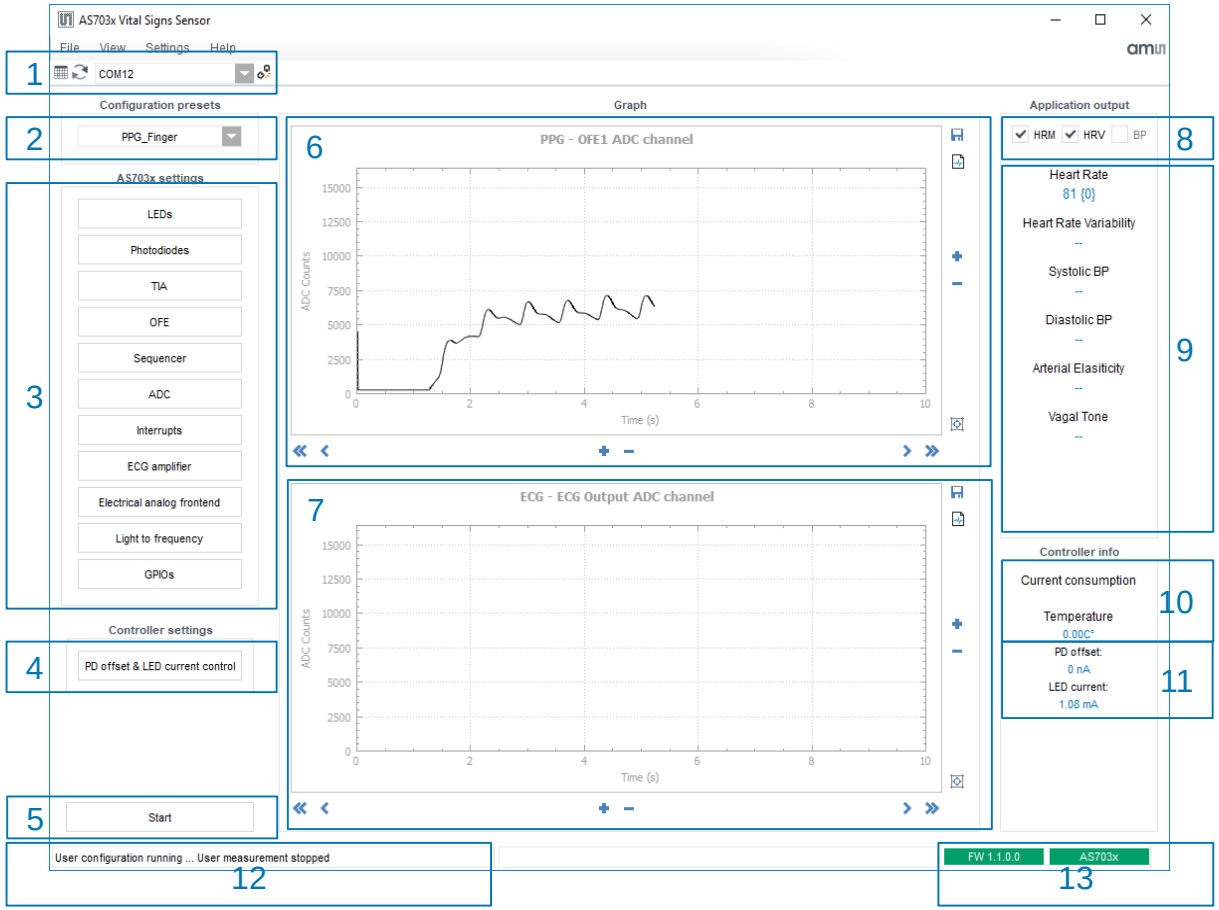
1. Download the Evalkit Software from
   https://ams.com/as7038rb#tab/tools
   https://ams.com/as7038gb#tab/tools or copy from the USB stick
2. Install the Evalkit Software
3. Optionally connect electrodes to the external electrodes connection
4. Connect the micro USB to USB cable to the board and plug it into your computer
5. The green LED will turn ON as soon as the board is powered
6. Start the client software

Note: For external ECG functionality costumer needs to build their own cabling harness
The pinout of the electrode connection is as follows



AS703x PC Software

Starting a PPG measurement (Apply for AS7038G)



- Select the appropriate COM port name from the drop down box (1)
- Click the connect button
- Connect button will change its icon to upon successful connection
- The two status boxes on the bottom right side will turn green and show the FW number currently flashed on the board (13)
- Select AS7038G_PPG_OFE_Finger or AS7038G_PPG_ULP_Finger from the built in configuration presets (2)
- Optionally check and change AS703x settings
- Start the measurement with a click on the Start button
- Put the index finger on the AS7038 to measure the PPG signal
- The PPG waveform will be displayed in the PPG window of the GUI (6)
- The Heart Rate (HRM) and Heart Rate Variability (HRV) will be displayed on the right hand side of the window (9)
- The numbers in curly brackets show how many seconds have passed since the last result was reported

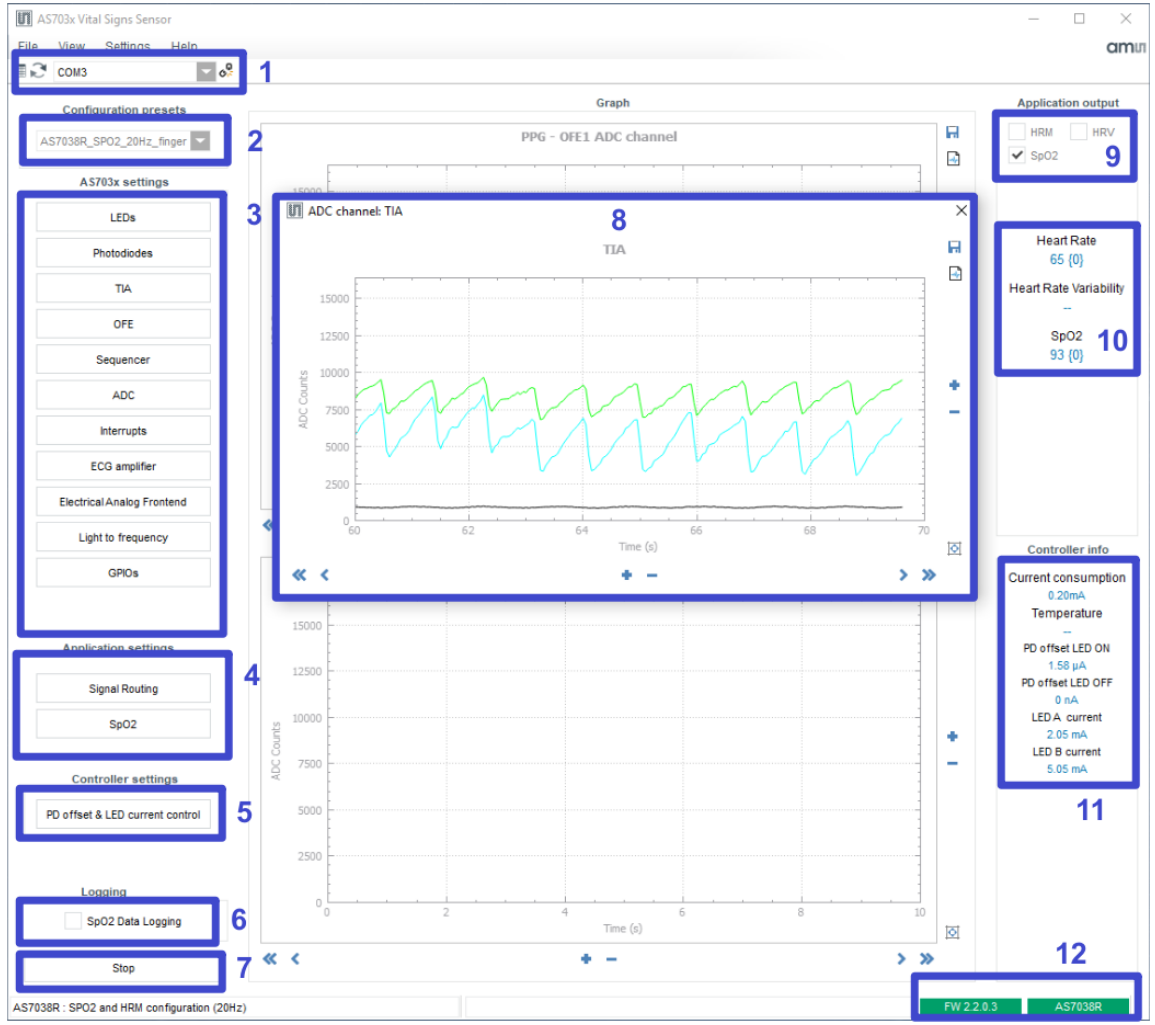
AS703x PC Software

Starting a combined PPG/ECG measurement (Apply for AS7038G)

- Select the appropriate COM port name from the drop down box (1)
- Click the connect button
- Connect button will change its icon to upon successful connection
- The two status boxes on the bottom right side will turn green and show the FW number currently flashed on the board (13)
- Connect ECG electrodes to the electrode connection
- Select AS7038G_PPG_ECG_finger from the built in configuration presets (2)
- Optionally check and change AS703X settings.
- Start the measurement with a click on the Start button.
- The green AS7038 LEDs will turn on, Start button's caption will change to Stop
- Put the index finger on the AS7038
- The PPG waveform will be displayed in the PPG window of the GUI. (6)
- The ECG waveform will be displayed in the ECG window of the GUI. (7)

AS703x PC Software

Starting a SPO2 measurement (Apply for AS7038R)



- Select the appropriate COM port name from the drop down box (1)
- Click the connect button
- Connect button will change its icon to upon successful connection
- The two status boxes on the bottom right side will turn green and show the FW number currently flashed on the board (12)
- Select AS7038R_SPO2_20Hz_finger or AS7038R_SPO2_200Hz_finger from the built in configuration presets (2)
- Optionally check and change AS703X settings.
- Start the measurement with a click on the Start button.
- The red AS7038 LEDs will turn on, Start button's caption will change to Stop
- Put the index finger on the AS7038
- The PPG waveform will be displayed in the pop-up window of the GUI. (8)
- The Heart Rate (HRM) and SPO2 will be displayed on the right hand side of the window (10)
- The numbers in curly brackets show how many seconds have passed since the last result was reported

AS703x Signal optimization

Two settings have a major impact on signal strength and quality:

- LED current
- OFE gain
- TIA gain

LED current has a direct impact on signal strength with minimal impact on noise.

OFE gain will increase overall signal strength but also increase noise.

We recommend the following settings to begin with and start experimenting from there:

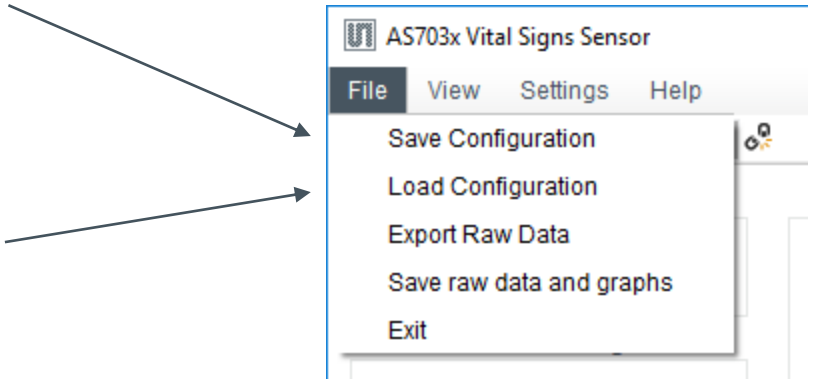
Use case	LED current [mA]	OFE gain	TIA gain
Finger	0.768	4-8	2M-3M
Light skin wrist	2	8	7M
Dark skin wrist	5	16	7M

AS703x PC Software

Saving and loading configuration

To save the current configuration settings, click on the File → Save Configuration menu. This will open the Save Configuration File dialog box. Enter file name and choose the file location, then click Save.

To load a previously exported configuration, click on the File → Load Configuration menu. This will open the Select Configuration File dialog box. Select the configuration file from which to load settings and click Open.



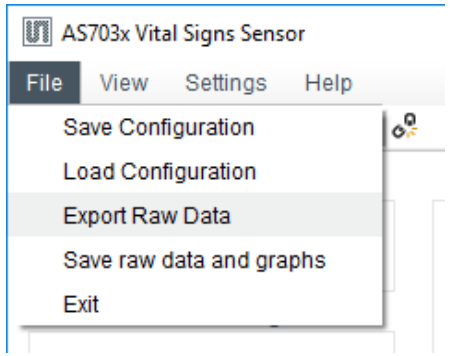
AS703x PC Software

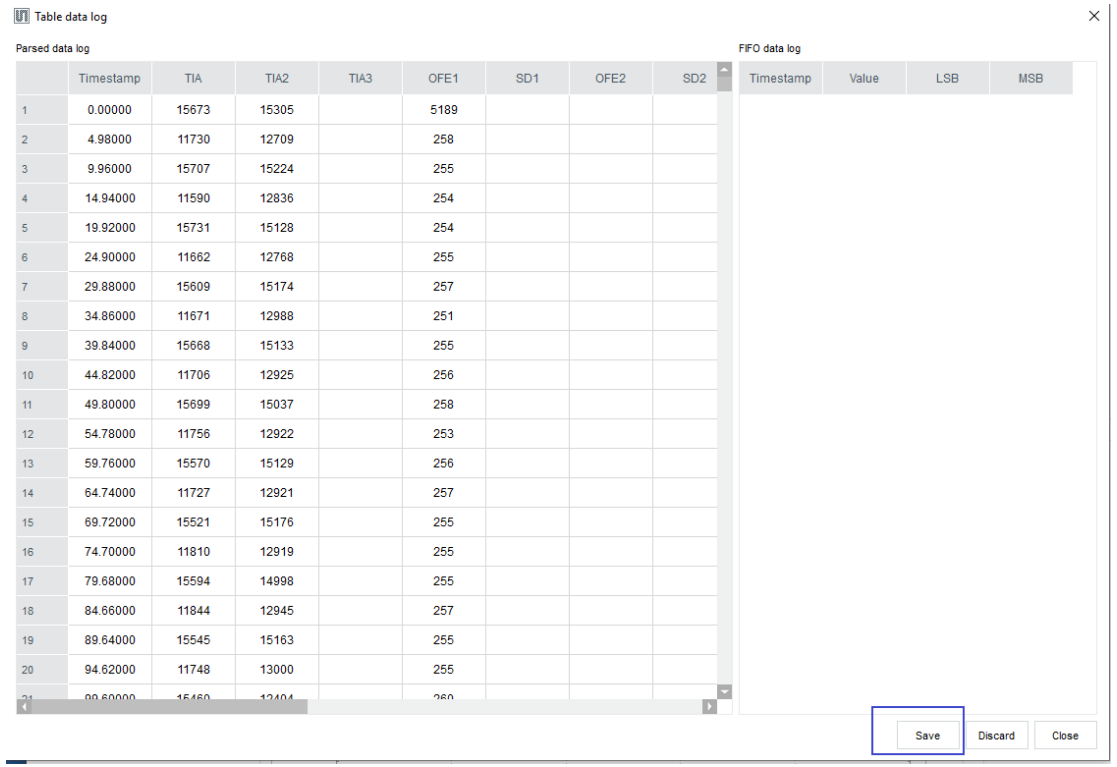
Raw data logging and exporting

By default, during measurement the raw data from the AS703x is logged in memory. When a measurement is stopped, this data can be exported to a .csv file by clicking on the File → Export Raw Data menu and selecting the file location and file name in the Save File dialog box.

Raw data file format:

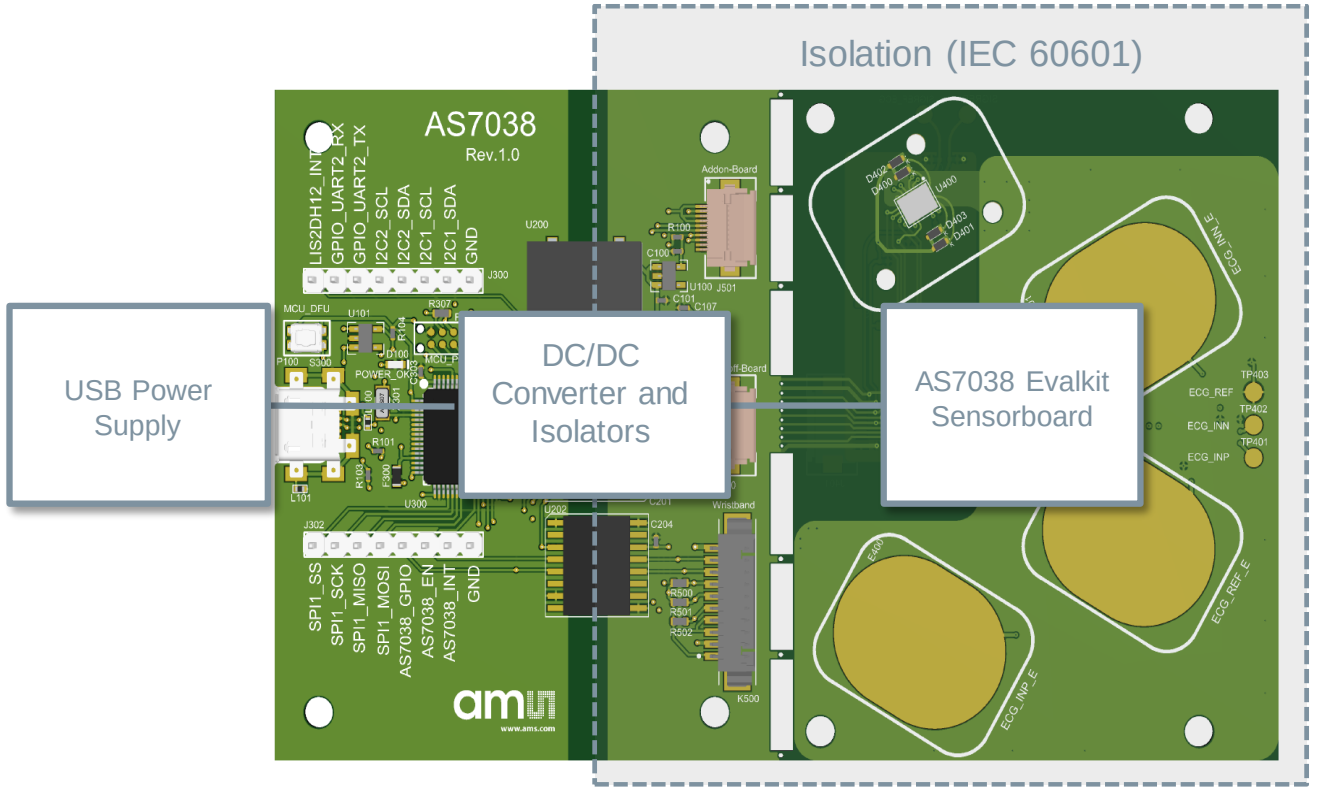
- First row has the column captions
- First column has the timestamp in milliseconds
- The rest of the columns contain the data from the enabled ADC channels





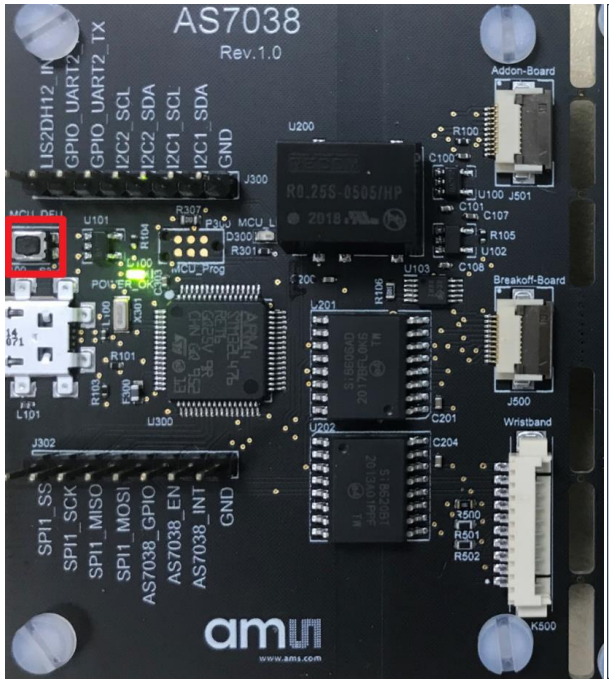
Safety compliance

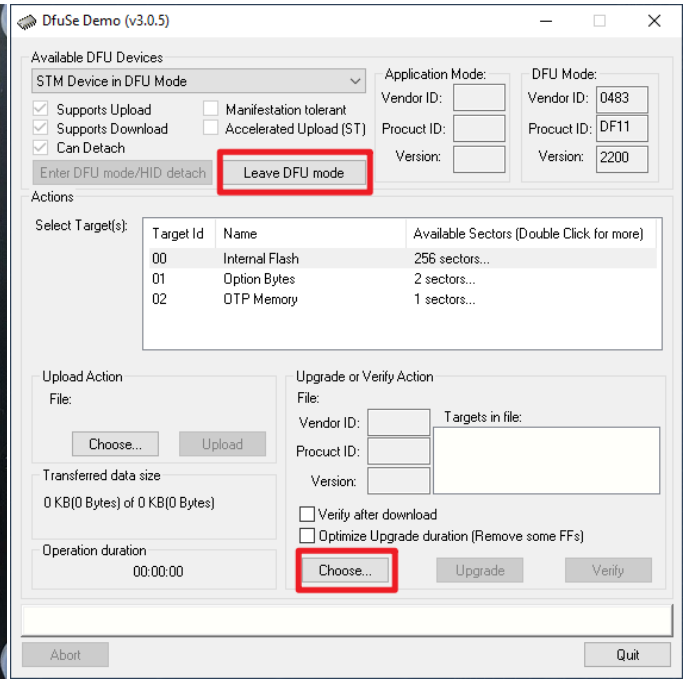
The AS7038 Eval Kit is supplied by USB connection to the PC. In order to avoid a direct connection from the electrodes to the power grid, an IEC 60601-1 compliant RECOM DCDC converter (R0.25S-0505/H or R0.25S-0505/HP) is assembled on the board as well as isolator ICs for any other signals, which means that there is no physical connection between the break out part of the board and the power grid.



AS703x Firmware upgrade

Optional FW upgrade over USB





- Press and hold DFU taster on the board (next to the USB connector)
- Connect USB cable -> release DFU taster (The board is now in DFU mode)
- Start DfuSeDemo.exe from the folder \your SW install \ams\AS703x_Vital_Signs_Sensor\extras\DFU
- In “Upgrade or Verify Action” ,Click on Choose…, a window will pop-up
- Find the folder with the new firmware, select the FW and click Open
- Click Upgrade
- After FW upgrade, quit the DFU software by disconnecting the USB cable from the board or click “Leave DFU mode” button.
- Connect USB cable again, start the GUI. In the right bottom corner of the GUI, the new FW version will be shown.

Thank you!

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