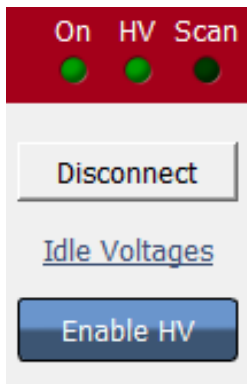
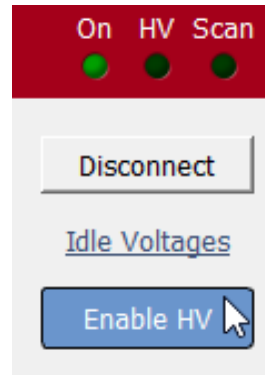
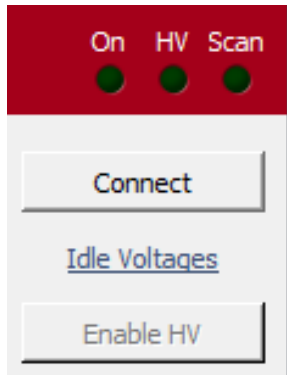


Vertex Quick Start Guide

support@impedans.com

Initial Connection



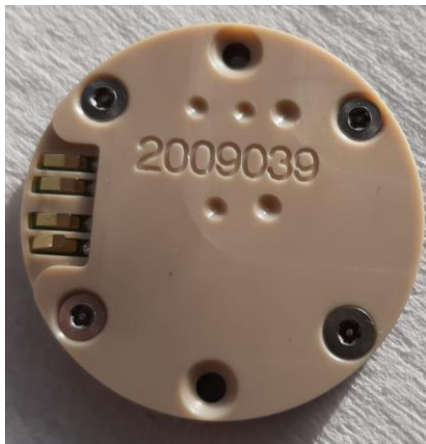
The initial hardware connections that must be made prior to the software connection is the power and USB to the control unit.

Once this is done then click the 'Connect' button and once connected a green Light will show.

Once this has happened it is recommend to turn on the High Voltage outputs by selecting 'Enable HV' after which the green light should turn on.

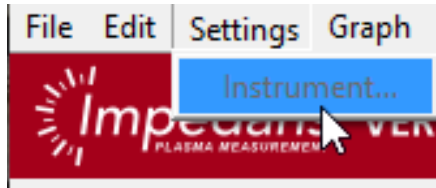
Flux Factor Settings

The table below shows the appropriate flux factor for the various buttons based on the number of indents on the back above and below the serial number as shown in the image of a button

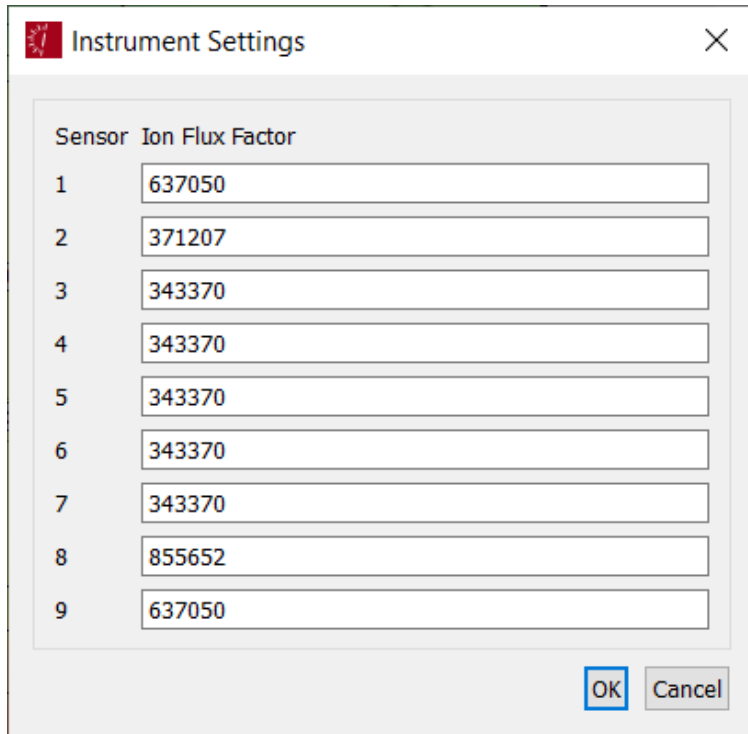


Above / Below	1	2	3
1	3.71E+04	3.41E+05	4.62E+06
2	5.30e+04	6.32E+05	8.56E+06
3	2.24E+05	6.32E+05	8.56E+06
4	5.30e+04	6.32E+05	8.56E+06
5	5.30e+04	6.32E+05	8.56E+06
6	5.30e+04	6.32E+05	8.56E+06

Flux factor settings



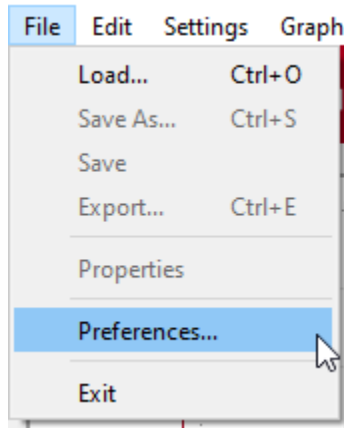
If using buttons that are not the standard density buttons then the flux factor should be changed.



This is done by opening the Instrument Settings page and filling in the flux factors for each individual button.

This allows the user to use a mixture of buttons if desired such as if the centre of the wafer will see a much denser plasma than the edges of the wafer then using high and standard density buttons respectively would be useful to prevent any buttons saturating

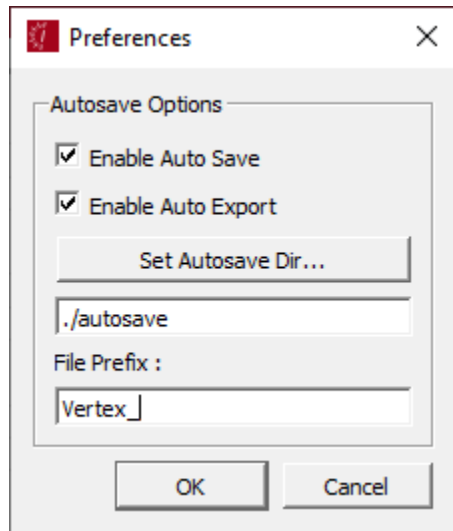
Autosave and Auto export Setup



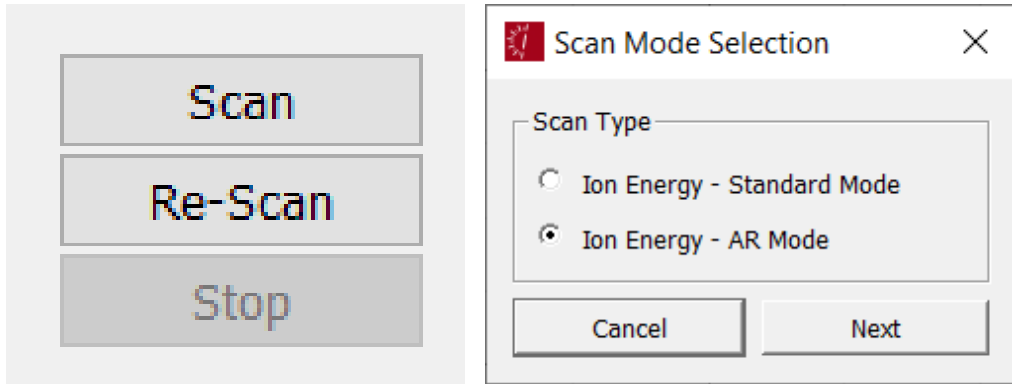
It is advised to set up the software to autosave the data by going to 'Preferences' under 'File' as shown

Autosave will save the native Vertex file format (.vdf) which will be useful for any diagnostics if there are any problems

The Auto export will save the data as a csv file allowing the user access to the data

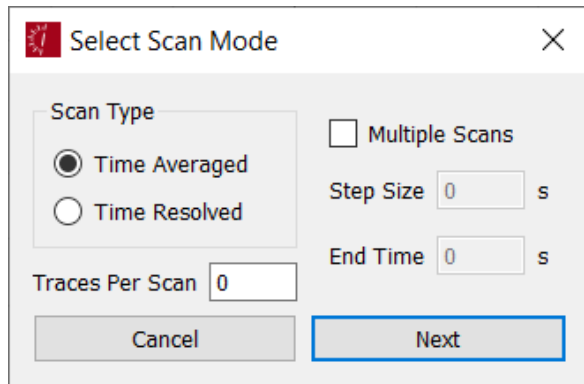


IEDF Scan Settings



To set up the scan click the 'Scan' button followed by 'Standard Mode'

The first scan that is typically run is a time averaged scan.



By setting the 'Traces Per Scan' to 0 it will continuously take IV traces until you manually stop the scan – Alternatively you can set a particular number of scans to be taken.

If you wish to look at the stability of the plasma over a particular period you can setup the multiple scans with a certain time frame and time step'

IEDF Scan Setup

Scan Settings

[Advanced Settings](#)

Electrode Voltage

Use Measured -150.4 V

Override 0 V

Energy Range 200 eV

Energy Resolution 2 eV

Cancel Previous Run Scan

Select 'Use measured' for the Electrode Voltage (Vdc) – Will update live when connected to a system.

Input the Ion Energy Range (60 V or 2x the Bias voltage whatever is greater).

Select the Energy Resolution (1 eV or 1% of the Ion Energy Range which ever is greater – To the nearest eV).

This typically is enough to run the scan but there are more settings that can be accessed under 'Advanced Settings'

IEDF Scan Setup – Advanced Settings

Scan Settings

[Quick Settings](#)

Electrode Voltage

Use Measured V

Override V

Voltages | Timing | Sensors | Sync

G1 V

G2 Scan

G3 V

C V

Sensor Grids

Start V

End V

Step V

Sensor Current Ranges

uA

Using Collector As Discriminator

Cancel Previous Run Scan

The voltages are set based on the Vdc, energy range and resolution set in the previous window.

The recommend values for each as follows:

Start: $V_{dc} - 20$ V

End: $V_{dc} + \text{Range} + 20$ V

Step: Resolution Desired

G3: $V_{dc} - 70$ V

C: $V_{dc} - 60$ V

Can also adjust the Current range from the drop down menu

Scan Setup – Advanced Settings

Scan Settings

[Quick Settings](#)

Electrode Voltage

Use Measured V

Override V

Voltages | **Timing** | Sensors | Sync

1. Bias Grid settling time from end of previous scan ms

2. Bias grid settling time from end of previous step us

3. IV accumulation time us

Cancel Previous **Run Scan**

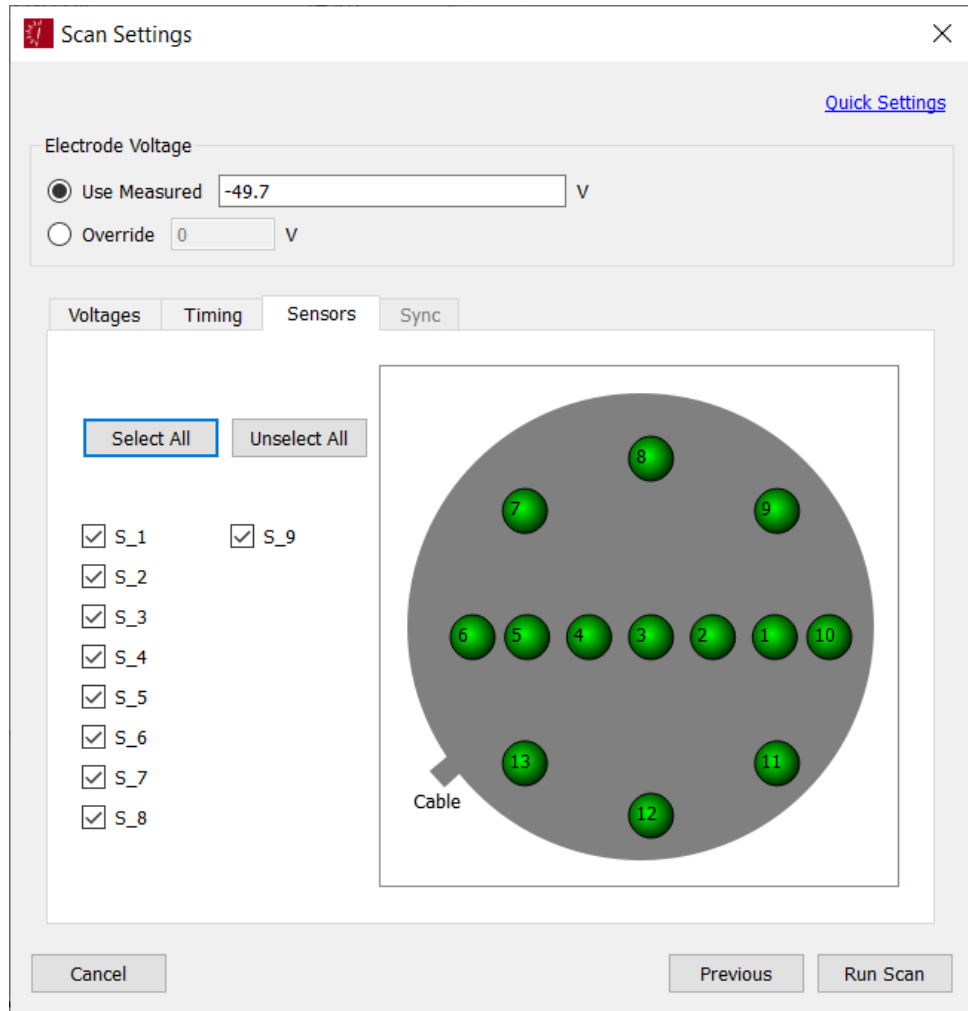
The recommended timings are shown.

First sets the wait time between scans to allow the electronics to change from the high voltage a scan ends at to the voltage it will start the following scan.

The second timing is how long it waits between voltage steps

Final is how long it spends at each voltage averaging data

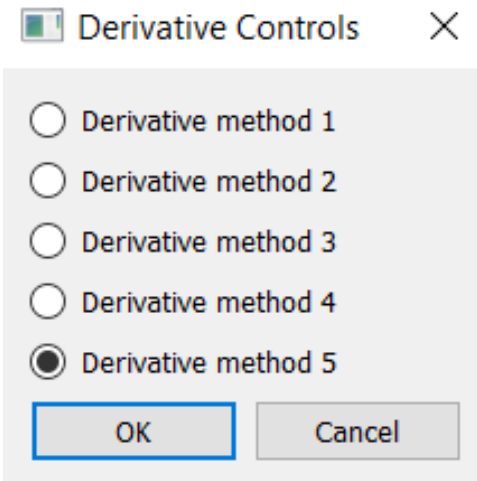
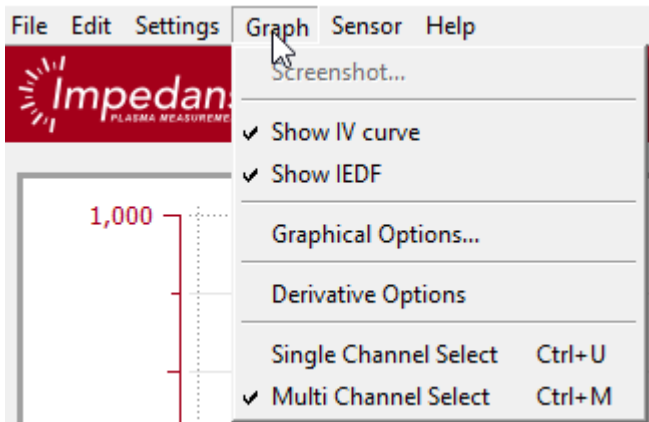
Scan Setup – Advanced Settings



This tab allows the user to select which sensors are active with a future update allowing different sensor geometries to also be selected.

Once all of these settings have been chosen the scan can be started by clicking 'Run Scan'

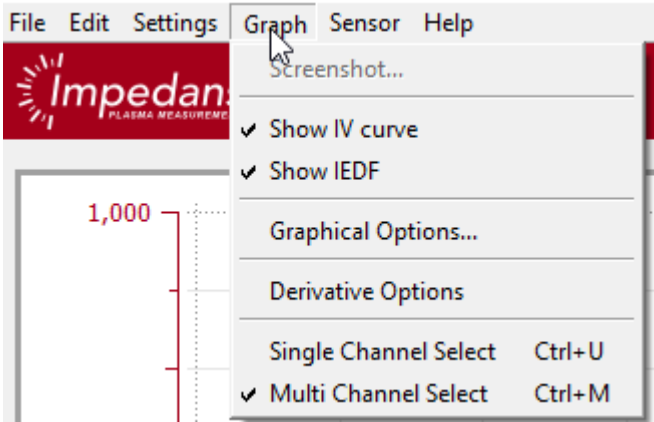
Graph Controls



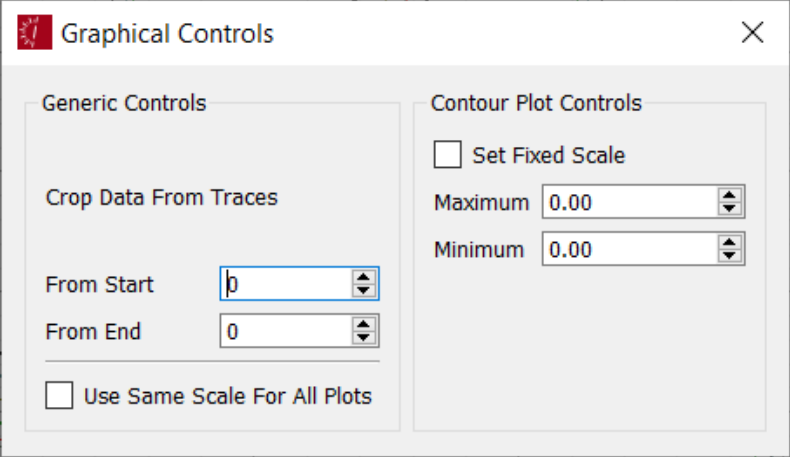
The Derivative options allows the user to choose the 'method' for calculating the IEDF with the numbers referring to how many points are used either side of the current voltage.

For more information on the derivative calculation see the user manual which can be accessed from: 'Help' → 'Help'

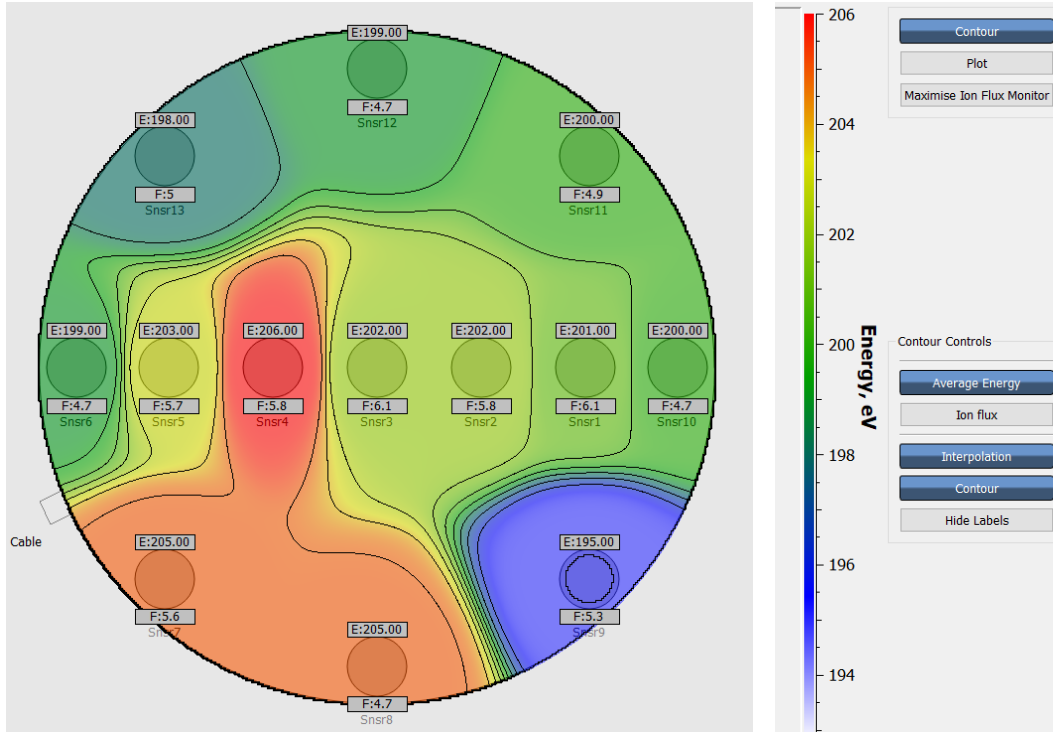
Graph Controls



The user also has the ability to crop data from the start or end of the scan which can be particularly useful if there is noise at the start or end of the scan.



Graph Controls

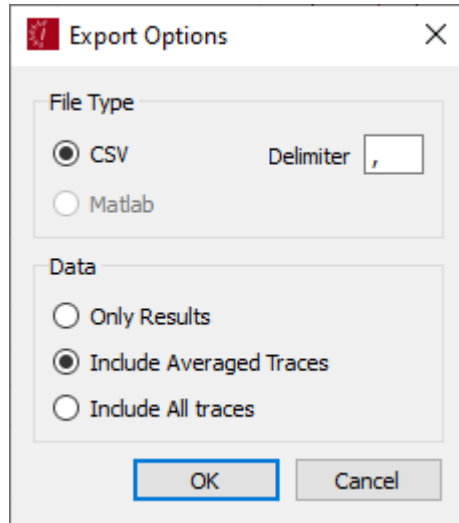


If using a multi-sensor you can also switch to Contour graphing mode

This plots either the 'Average energy' or 'Ion flux' at each position on the wafer with an interpolation between the points

User can also choose to have the contour lines and labels on each sensor showing or not as desired.

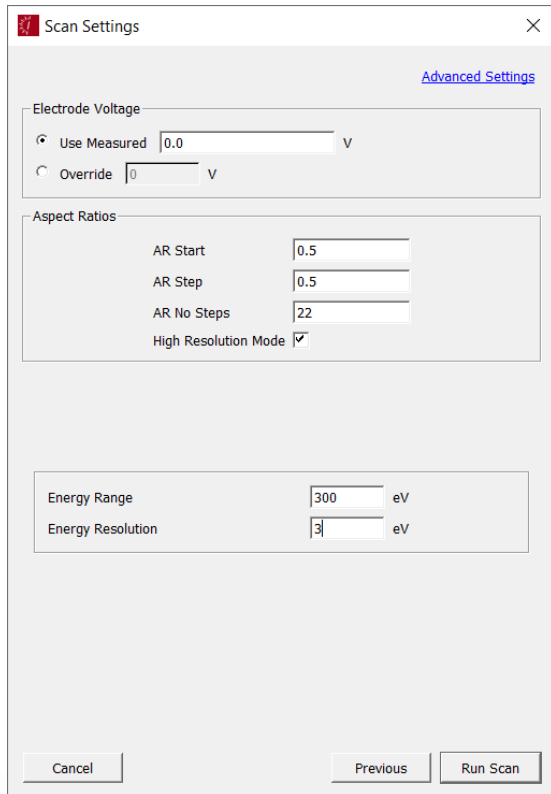
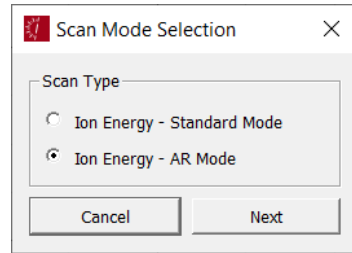
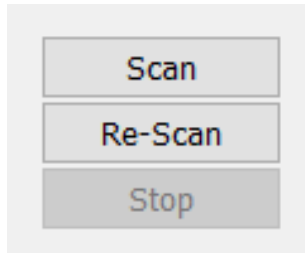
Scan Save/Export



Ensure to Save the scan (.vdf) as this is the native file format for the standard Ion energy monitor data (required for any diagnostics if a problem arises)

For access to the data you can export the data to a csv file with the ability to chose what data is exported as well as the separator used (, is not recommended for European computers)

Aspect Ratio Mode



In order to do the aspect ratio mode scan first click 'Scan'

Then select 'AR Mode' for the scan selection

As with the IEDF scan select 'Use Measured' for the electrode voltage and set the Energy range and resolution as required

The Aspect ratio scan go from 0.5 to 20 in steps as low as 0.5

High Resolution mode should be selected

Aspect Ratio Mode – Advanced Settings

Scan Settings

[Quick Settings](#)

Electrode Voltage

Use Measured V

Override V

Aspect Ratios

AR Start

AR Step

AR No Steps

High Resolution Mode

Voltages | **Timing** | Sensors | Sync

1. Bias Grid settling time from end of previous scan ms

2. Bias grid settling time from end of previous step us

3. IV accumulation time us

1. AR G2 Step 1 us

2. AR G2 Step 2 us

3. AR accumulation time us

Cancel Previous Run Scan

‘Advanced settings allow the timings of the Aspect ratio scan be chosen.

The recommended settings can be seen in the image shown.

Once this has been set up the sensor is ready to scan

Saving the data is done as shown previously.

Impedans Ltd

Chase House, City Junction Business Park, Northern Cross,
Dublin 17, D17 AK63, Ireland

Ph: +353 1 842 8826

Fax: +353 1 871 2282

Web: www.impedans.com

Email: support@impedans.com

