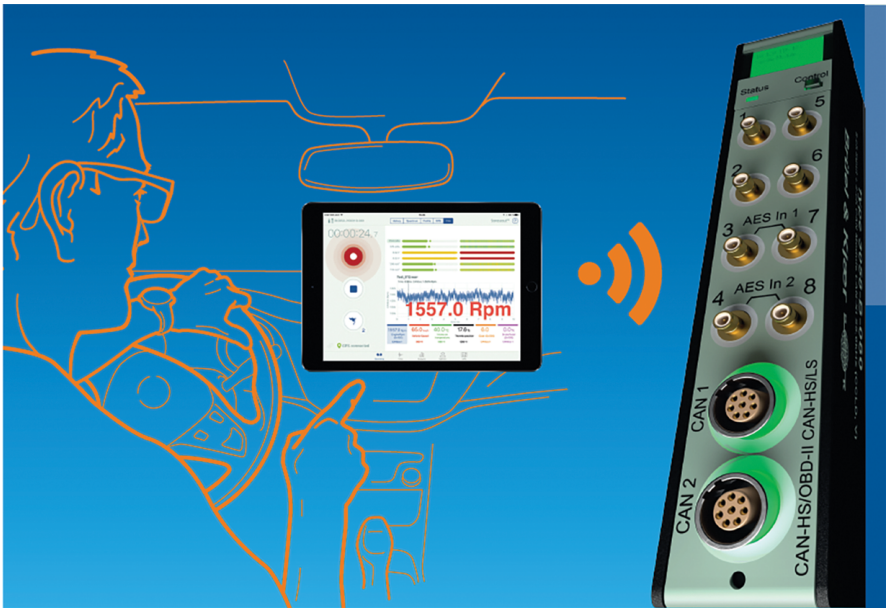
Sonoscout User Manual



Learn how to use the Sonoscout app together with a PULSE LAN-XI module.

Note: This User Manual can also be found as online help within the Sonoscout app.

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What's New in Version 2.01?

New Features

- **CAN Recording:**
  - Any raw CAN Signal can be converted to a profile, or tacho signal, and embedded in the BKC file
  - CAN, OBD-II and J1939 messages can be recorded together with analogue and tacho channels using LAN-XI CAN Module Type 3058. Up to 6 CAN signals can be displayed in real time
  - Any CAN profile can be exported to a .csv file
  - The raw CAN file can be exported to ASAM MDF format
- **CANdidate:** This is a simple to use wizard which enables the user to create a .dbc file, defining engine RPM, vehicle speed and throttle messages
- **Digital Head Recording:** Using LAN-XI CAN Module Type 3058. Two (or four) of the eight signal channels can be connected to one (or two) Digital Heads
- **Triggering** Any signal channel, tacho profile, CAN signal, GPS speed or GPS position can be used to start and/or stop the recording

Enhancements

- **Recording:** Improvements to Loading and Saving Recording Setups
- **Metrics:** Loudness and Sharpness as a function of Time, RPM or Speed
- Create a speed profile channel from the recorded GPS data
- Auto-scale font size for long file names
- Double-touch on small time history to define a range which is the whole file
- **Markers:** User can enter a description for each marker

What's New Message

The first time you run after updating to a new version a panel is automatically displayed which summarises the new features and enhancements in the updated software.

This only appears once. After that you can find the What’s New list in the User Guide.

Using Sonoscout

These instructions are based on the following configuration:

- Sonoscout app
- A single LAN-XI input module (with 4-, 6- , 8- or 12-channels)
- A LAN-XI battery module
- A LAN-XI WLAN frame
- Installed Sonoscout license

If you do not have this configuration, you can only run Sonoscout in the Virtual Front-end Mode.

For an introduction to Sonoscout NVH Recorder please see the video on the Brüel & Kjær page on YouTube: Sonoscout NVH Recorder. Other Sonoscout videos are also available on the same page.

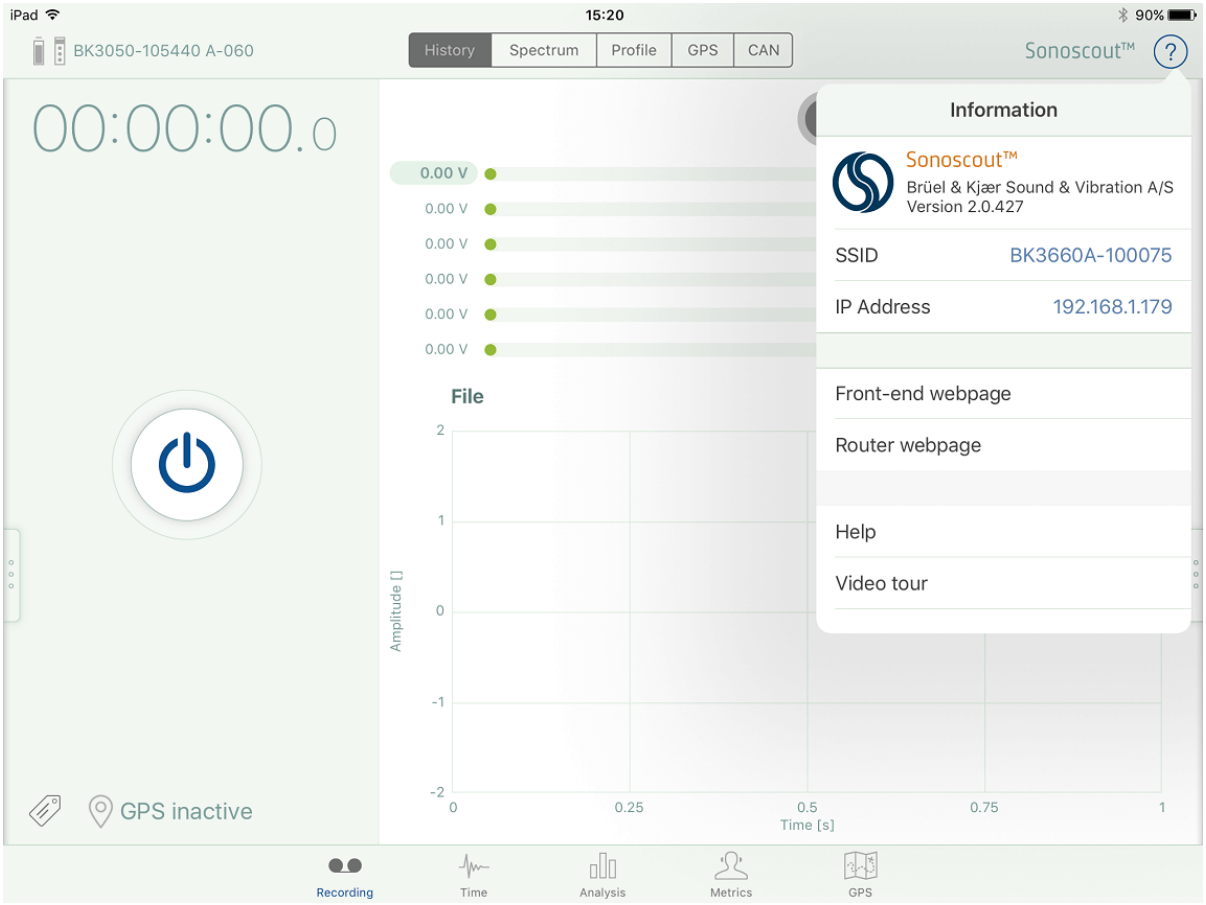
Starting Sonoscout

To start Sonoscout:

1. From the Home screen tap the *Sonoscout* icon. Sonoscout opens in the Recording Task:

Note: If Sonoscout does not detect a LAN-XI module, a warning message replaces the LAN-XI type and serial number.

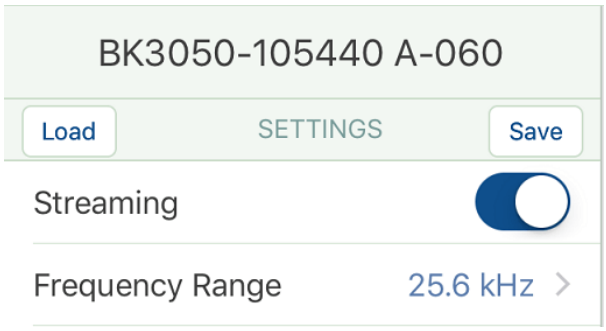
After startup, useful status information is also available in the Information dialogue:


iPad
15:20
90%
BK3050-105440 A-060
History
Spectrum
Profile
GPS
CAN
Sonoscout™
00:00:00.0
0.00 V
0.00 V
0.00 V
0.00 V
0.00 V
0.00 V
File
Information
Sonoscout™
Brüel & Kjær Sound & Vibration A/S
Version 2.0.427
SSID
BK3660A-100075
IP Address
192.168.1.179
Front-end webpage
Router webpage
Help
Video tour
Amplitude []
Time [s]
GPS inactive
Recording
Time
Analysis
Metrics
GPS

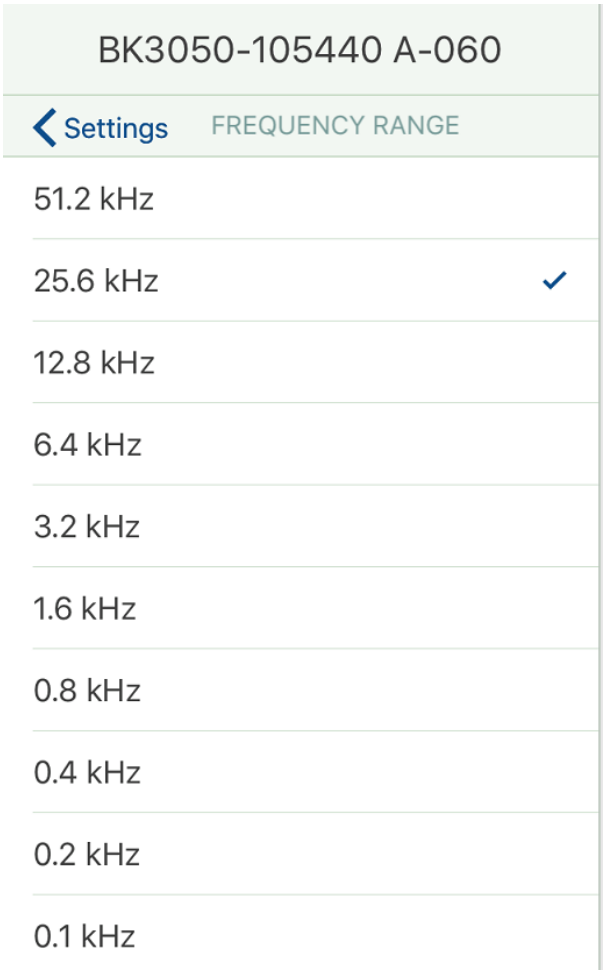
Setting up a Recording

Display Settings

1. Set *Streaming* to *Off* if you want to record the time files to the SD card of the LAN-XI Module, and set *Streaming* to *On* if you want to record directly to the mobile device:



2. Set the frequency range (module dependent). Data is sampled at 2.56* this frequency:

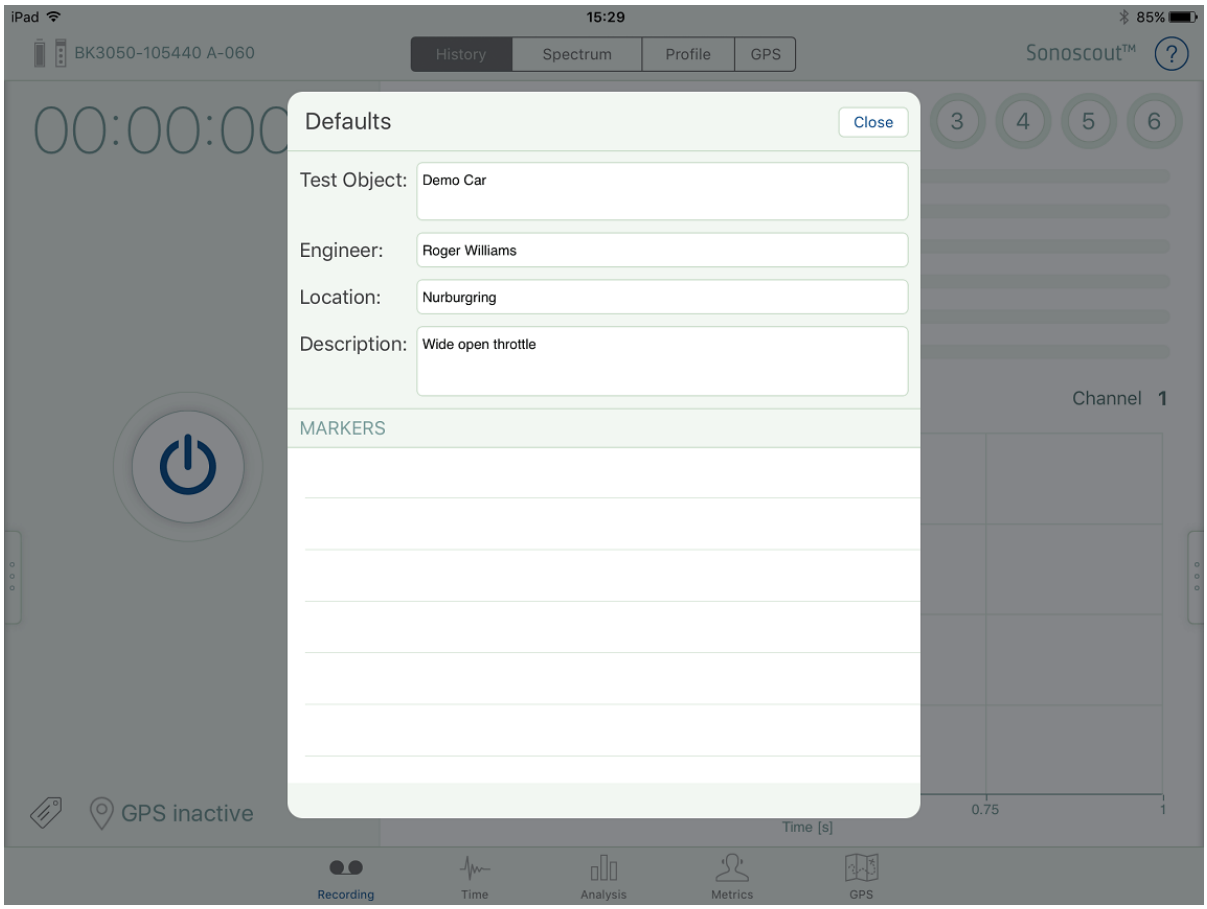


When you run for the first time after installing the app the default Frequency range is 25.6 kHz for all modules.

Tap *Settings* to return to the Settings menu, and swipe from the right side of the settings menu to the left side of the display to collapse the menu.

3. Alternatively, you can set up and/or review the complete channel table, see Setting up a Channel Manually.

4. If you tap the **Metadata** icon , you can enter descriptive information before you record each test:

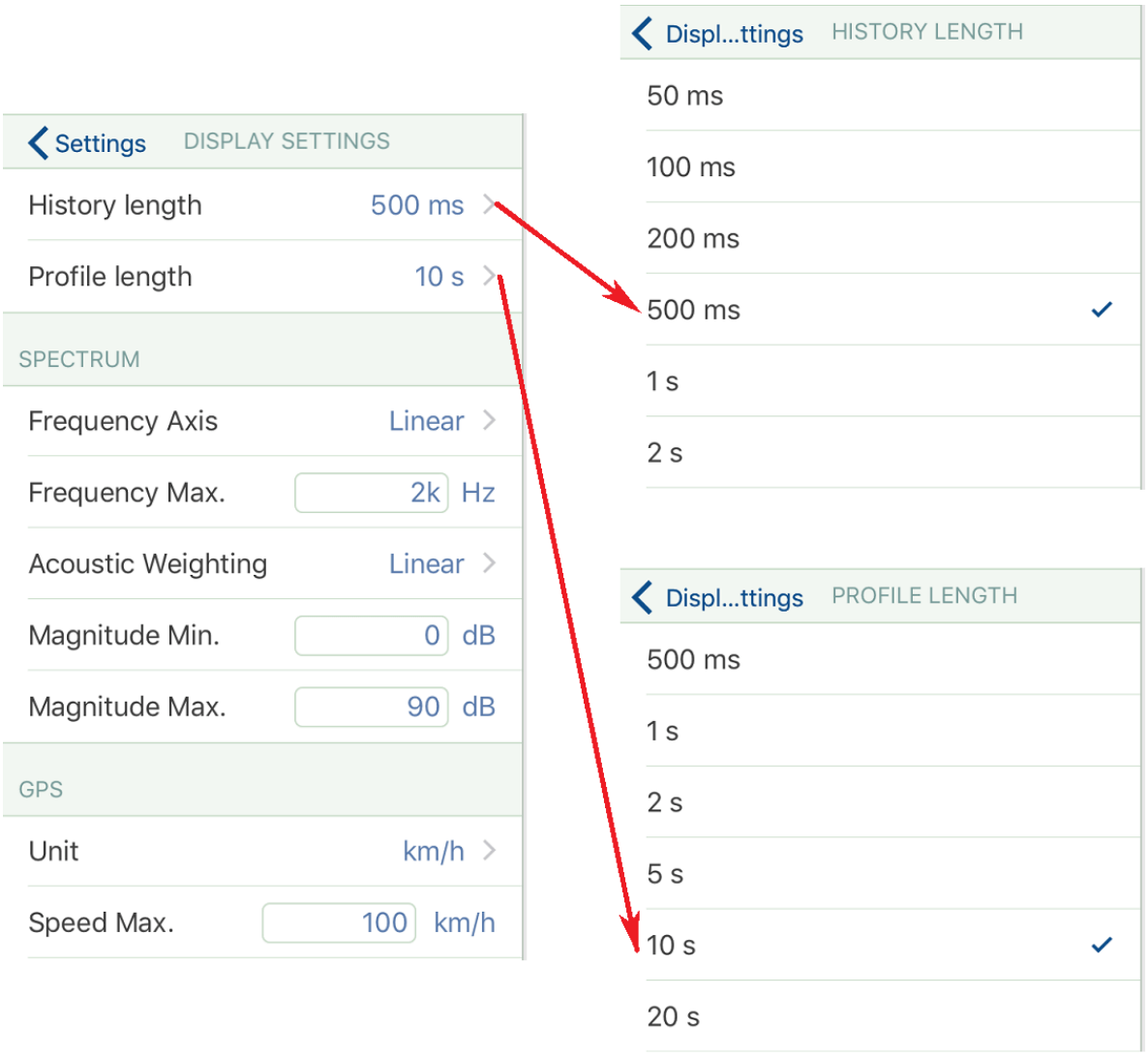


Note: This Metadata is also shown in PULSE™ Reflex.

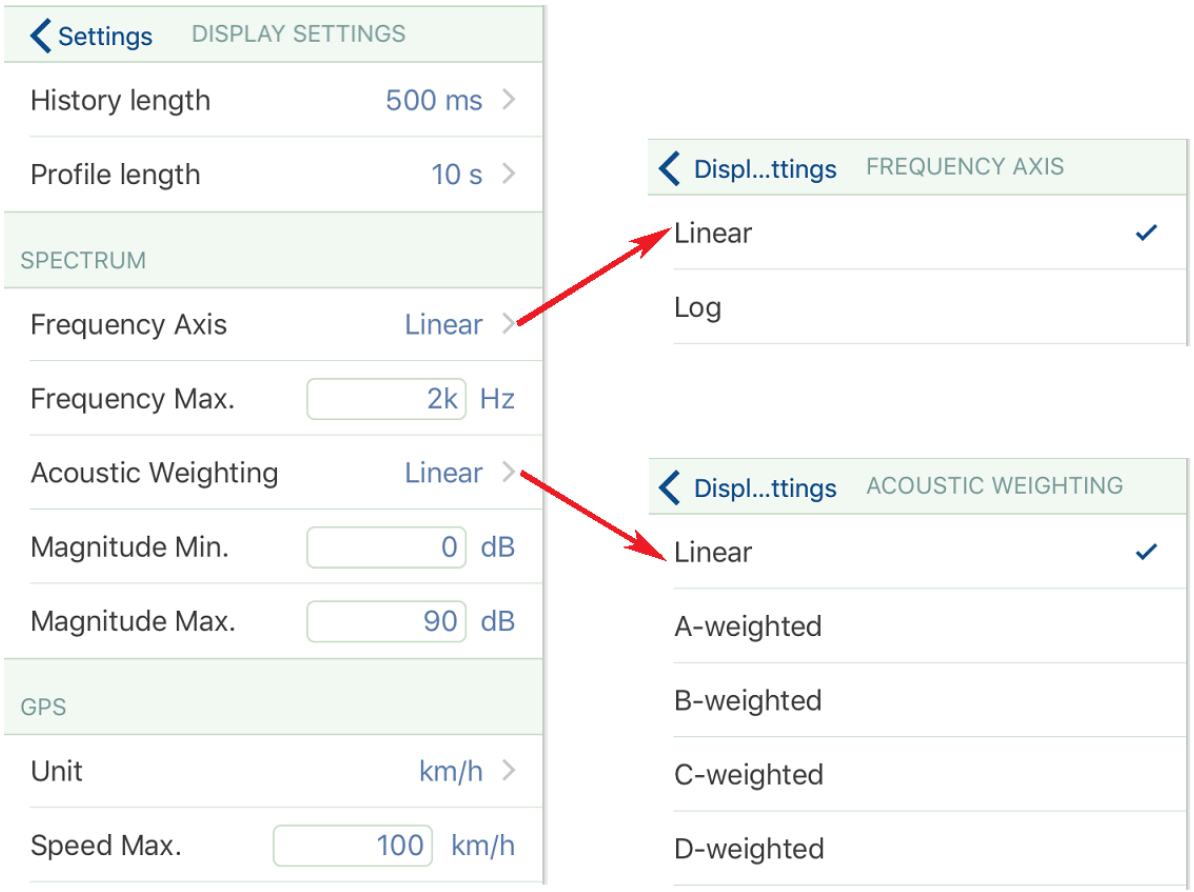
You can also edit the metadata after you have made the recording. So, for example, you could enter data in the *Test Object*, *Engineer*, and *Location* fields before you make any recordings, and enter an appropriate description immediately after each test has been recorded.

5. Tap on *Display Settings* in the Settings menu to change the various display settings, as required.

   You can set the length of the time axis for the real-time History and Profile displays by selecting them in the Settings menu:

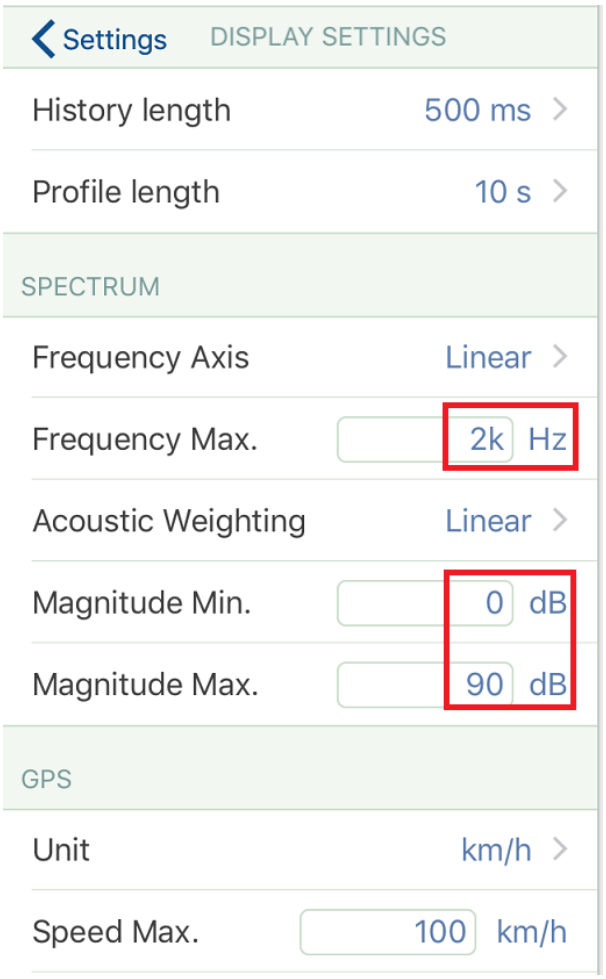


You can choose whether you want to use a Linear or Log frequency axis for the real-time Spectrum display and whether to apply an acoustic weighting (to sound pressure channels only).



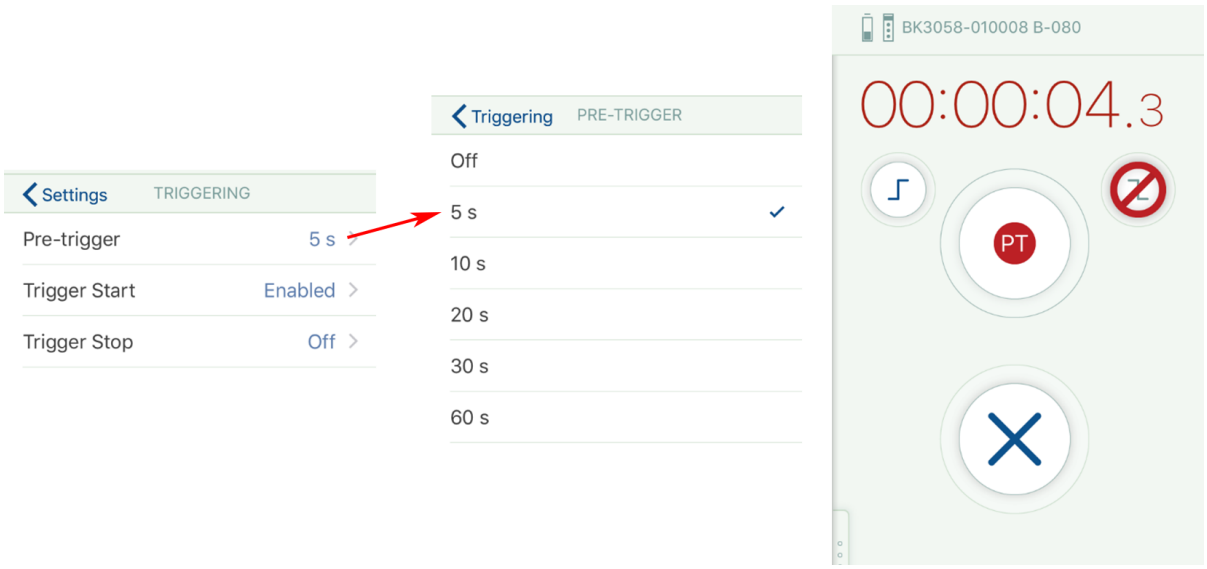
The GPS settings define the units which will be used for the GPS Speed Profile in both the real-time display and also in the post-processing display in the GPS task.

You can also specify the Magnitude and Frequency ranges for the real-time Spectrum. Sound and non-sound channels can have different magnitudes:



Pre-trigger

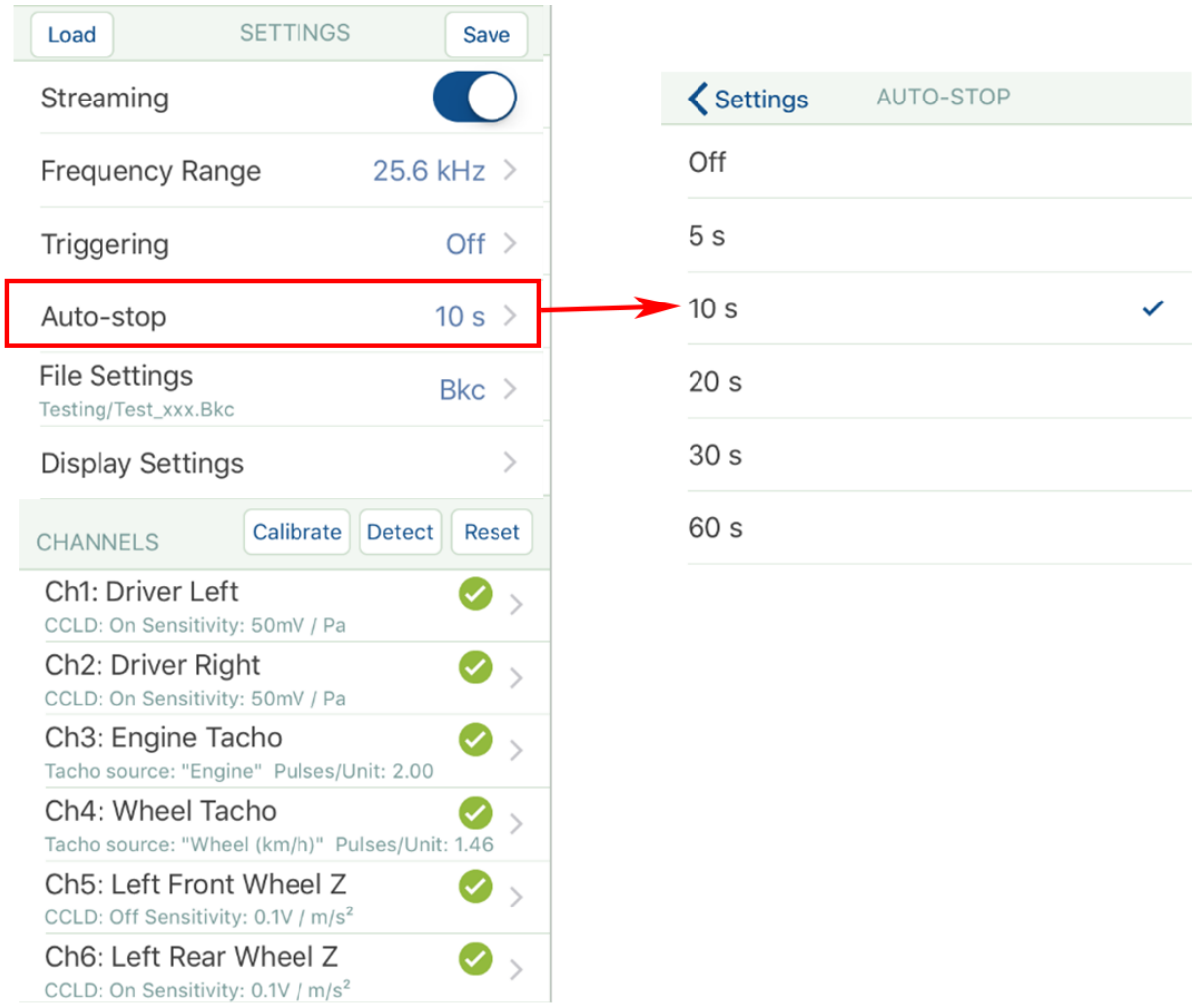
Pre-trigger continuously records and holds in memory the last N seconds of signals so that the Record button can be pressed after an event has occurred without loss of data. Provided the event happened within the N second period, it will be included in the recorded file.



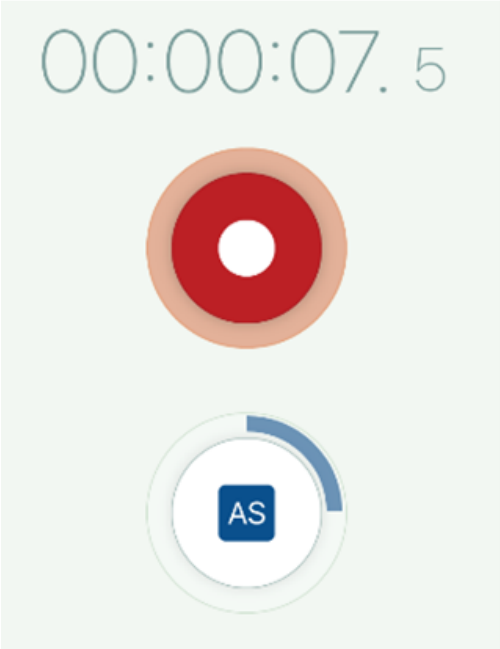
Pre-trigger can be used together with any combination of Manual Trigger, Trigger Start, Trigger Stop and Auto-stop.

Auto-stop

Auto-stop automatically stops the recording the specified time after the recording was started (manually or by pre-triggering).



There is an indication on the button of how much recording time remains.


00:00:07. 5
AS

Setting up a Channel Manually

Open the module settings menu in the Recording task (see below). This menu also includes the channel list, which allows you to set up your front end:

The type and serial number of the LAN-XI module you are using will appear at the top of the settings menu, and all channel settings will be at their default setting.

If you have TEDS transducers connected, tap **Detect** and the system will automatically fill in the details. The **Detect** button flashes whilst the system is detecting.

If you want to save any of the settings you have changed, tap **Save**.

Note: The **Reset** button does not reboot the LAN-XI module, it only resets the entries in this form by restoring them to their default settings.

TEDS Detection

When a TEDS transducer is detected. The following settings are automatically set:

- CCLD or 200 Volt Polarisation as appropriate
- Filters:
  - 7.0 Hz for accelerometers
  - 22.4 Hz for microphones
- Channel Type = Signal
- Grounded

The exception is the Laser Tacho Probe Type 2981, where the following settings are used:

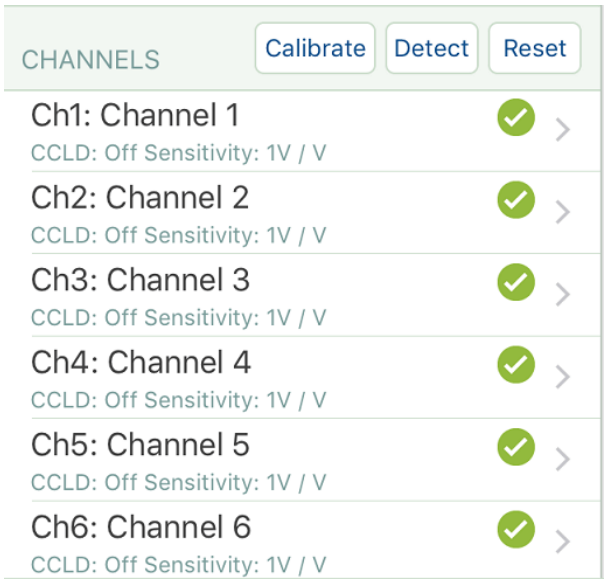
- CCLD
- 7.0 Hz Filter
- Grounded
- Channel Type = Tacho
  - Pulses per Rev = 1
  - Tacho Threshold = 50% Relative

If Binaural Recording Headphones Type 4965 are connected to a Type 3053-B-120 module the voltage range is set to 1 Volt after a Detect operation.

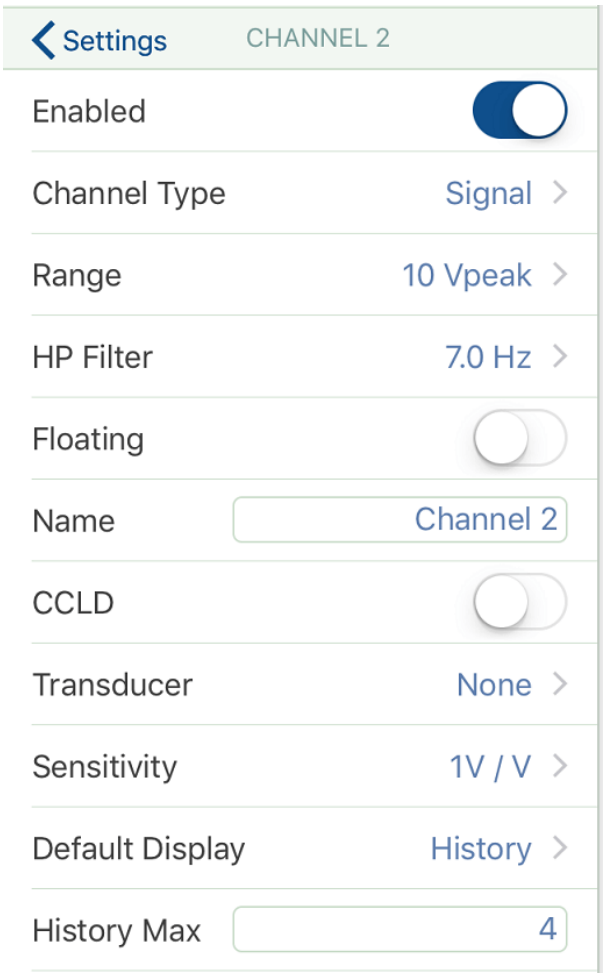
Procedure

If you are not using TEDS transducers, you can enter the values manually by selecting the channel and working through the following procedure:

1. Select the channel by tapping the relevant channel name in the channel list:

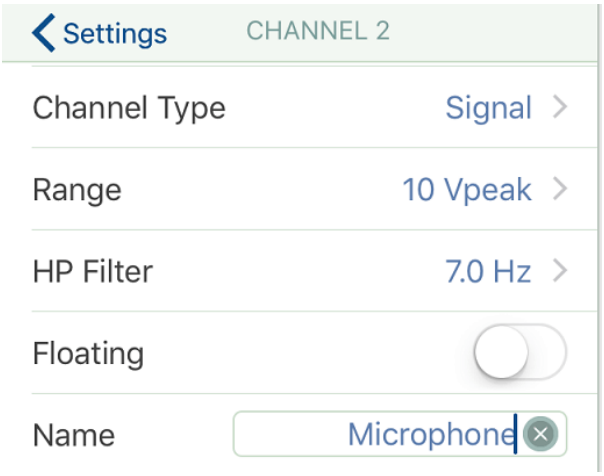


2. Enable the channel by tapping *Enabled On* and, if required, tap *CCLD On* and enter the maximum default value for the Profile display (*Profile Max*):



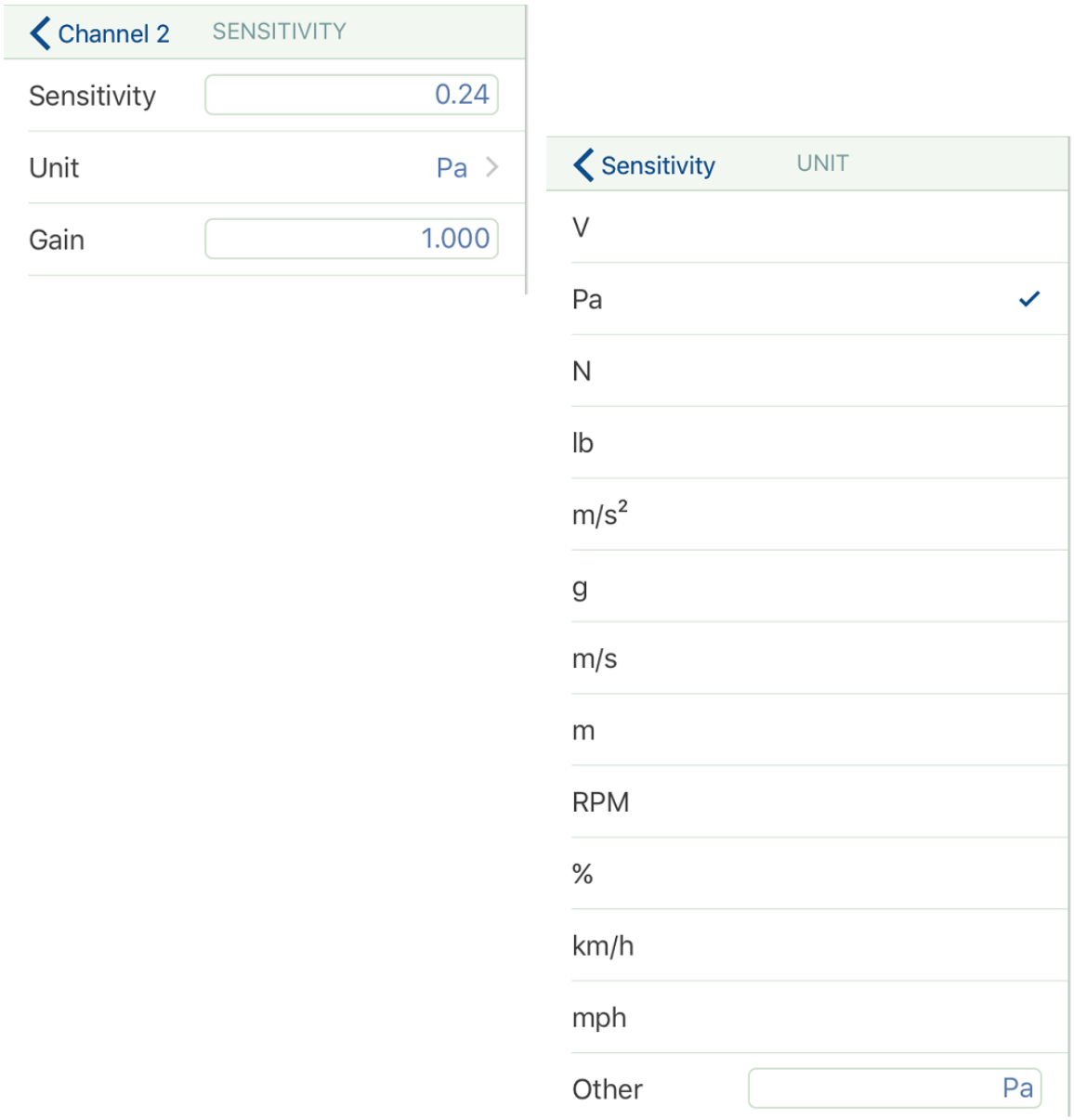
3. Choose the channel type: *Signal*, *Tacho* or *CAN*:

4. In the *Name* field, delete the default name and enter a new name:



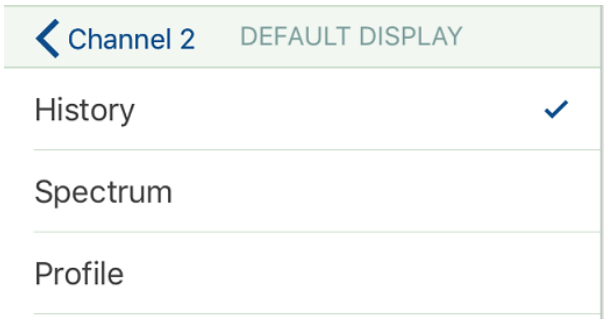
When finished tap **Done** on the keyboard.

5. In the *Sensitivity* field, enter the sensitivity value and select the unit from the list that appears when you tap *Unit*:

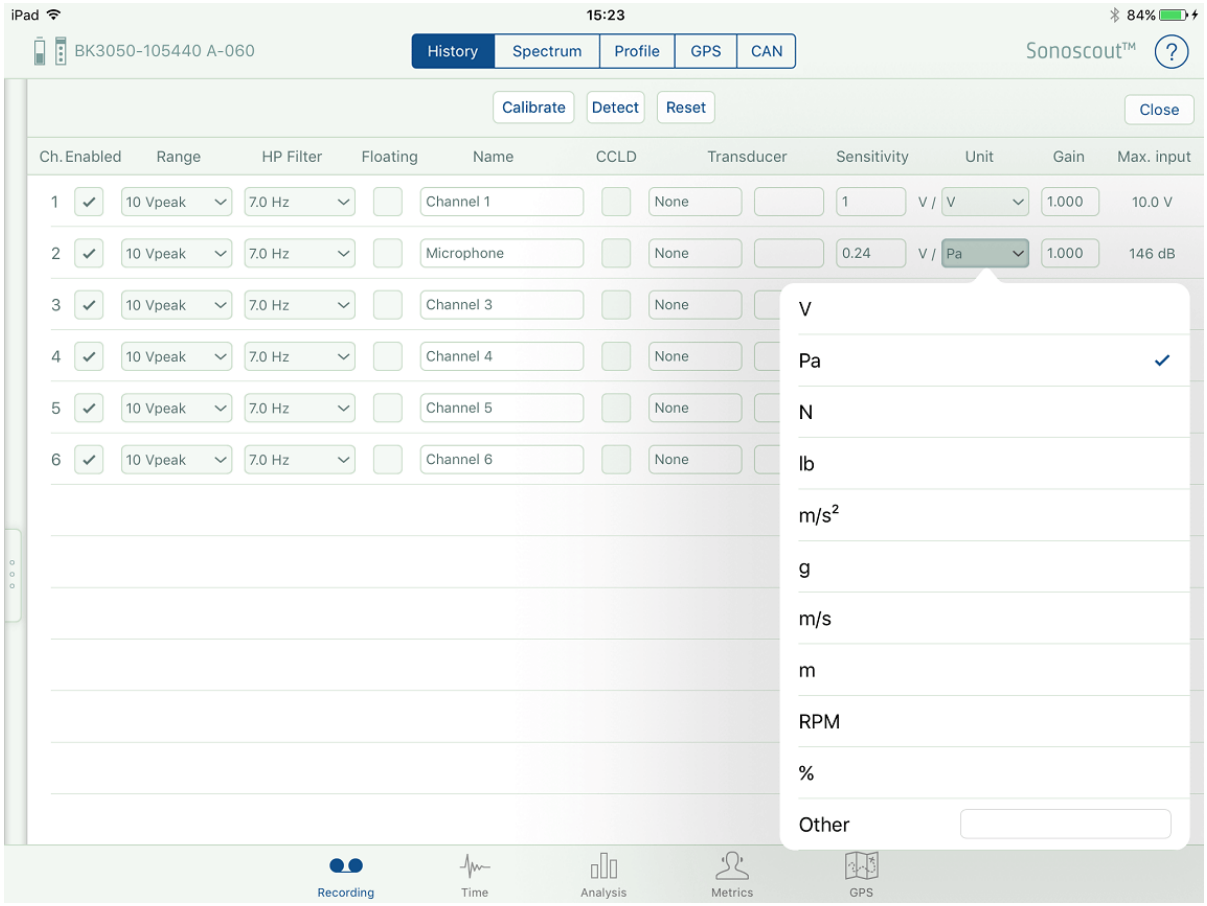


Note: Negative sensitivities are supported (these are needed for charge converters).

6. Choose the *Default Display* type, which is what the display will automatically switch to when you select the channel:



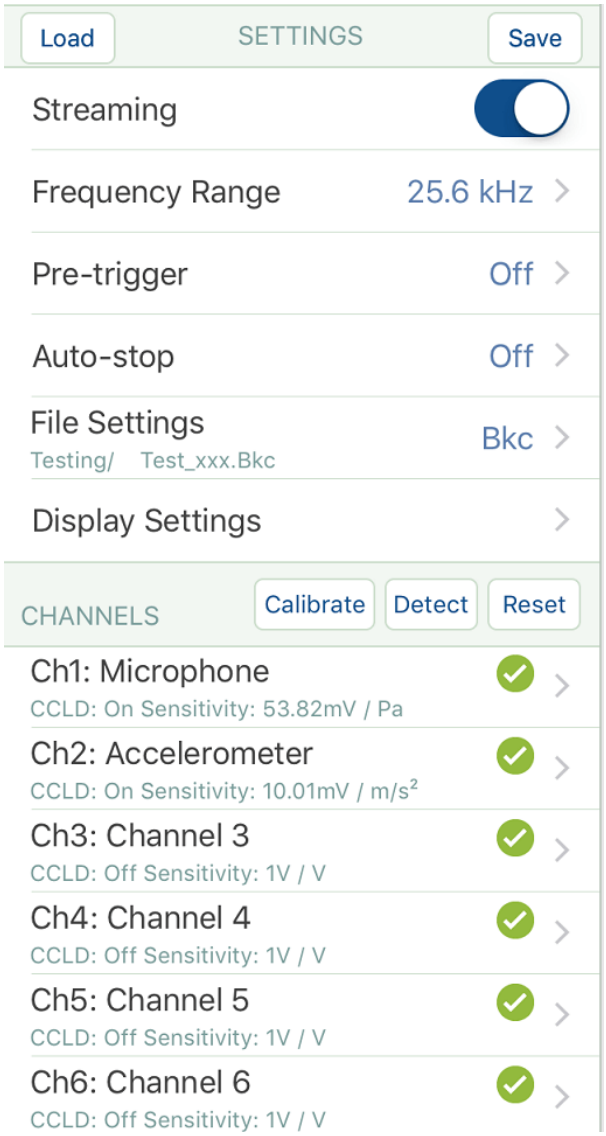
7. Alternatively, you can set up and/or review the complete channel table. To view, tap on the handle on the right to open the display:



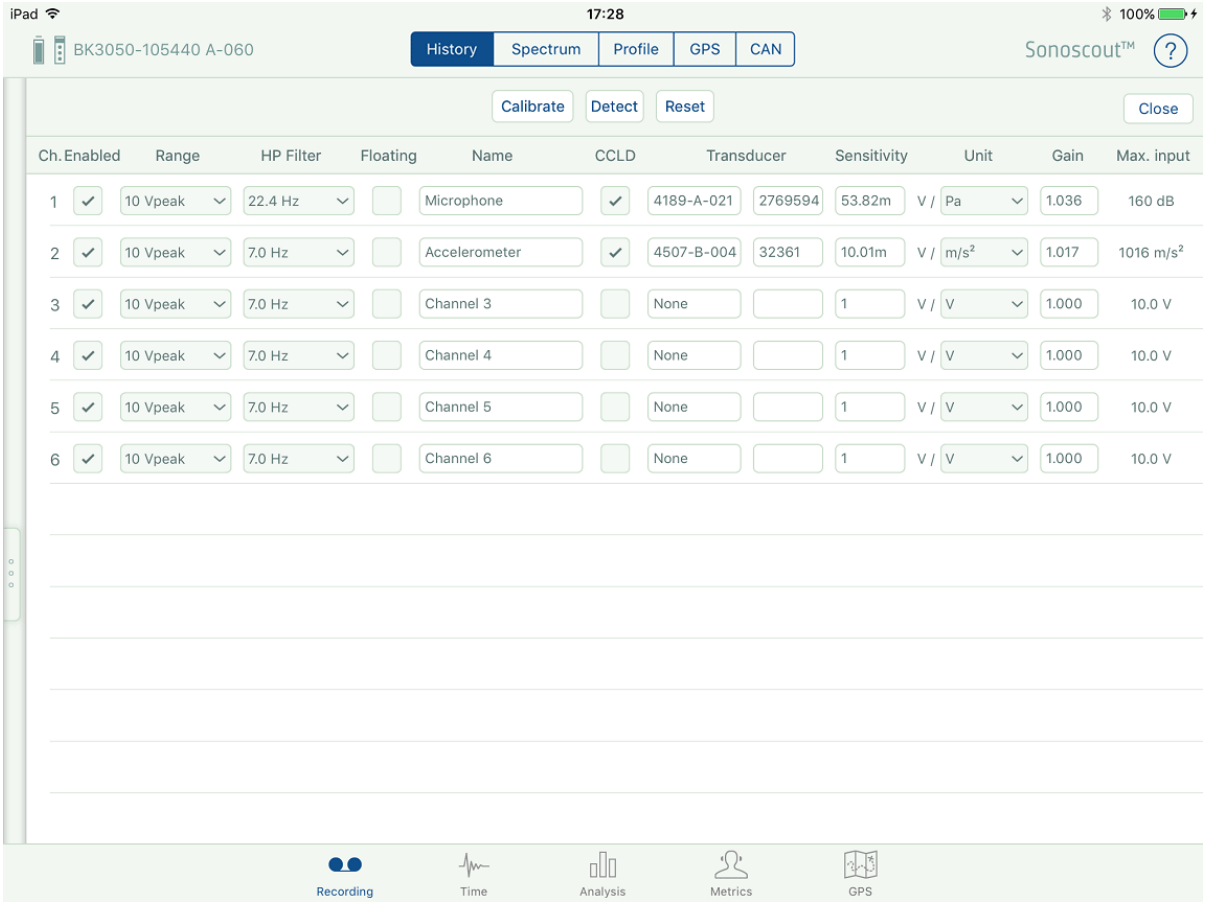
To change any of the channel settings, just tap on the relevant item in the table, for instance *Unit*, as in the example above.

Calibration

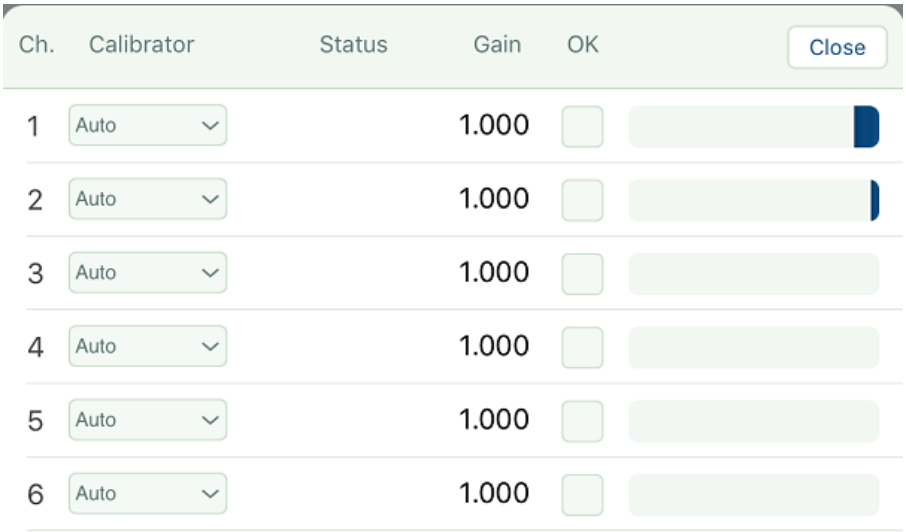
1. Swipe and open the settings menu on the left side of the display and tap **Calibrate** to start the calibration:



Alternatively, swipe the right side of the display to open the full width channel settings table (see below), and tap **Calibrate** to start the calibration:

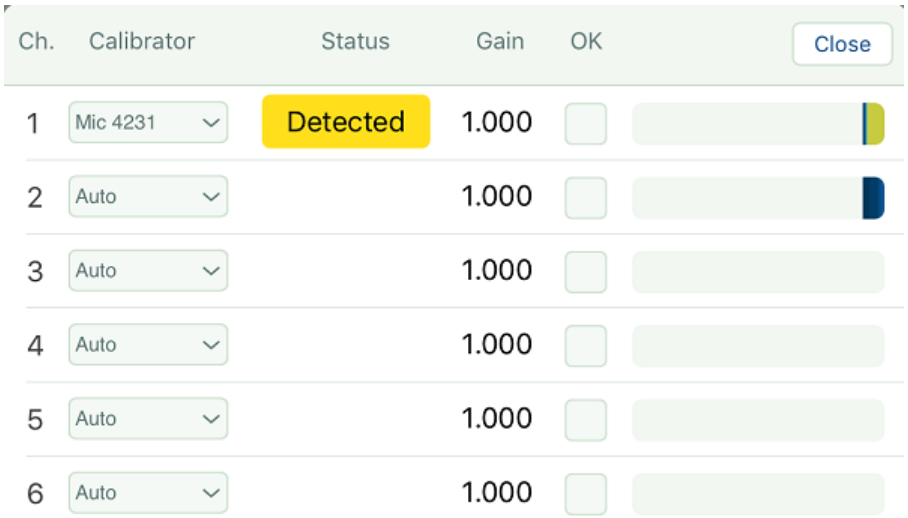


The calibration progress dialogue appears:

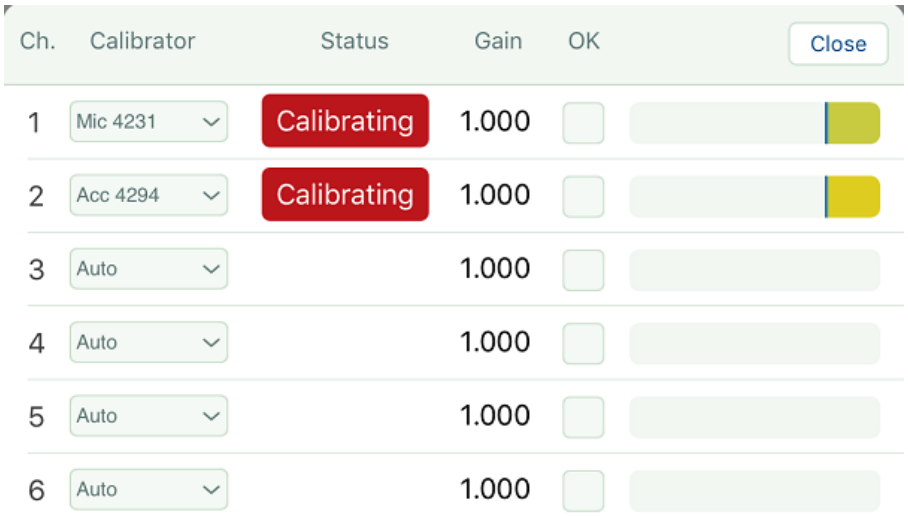


If all the calibrators are turned off, the dialogue is blank apart from the peak meters which start to display a 30 second peak history.

As soon as you turn on the calibrator it is detected (indicated by the yellow bar) and its type number is shown on the *Calibrator* drop-down:

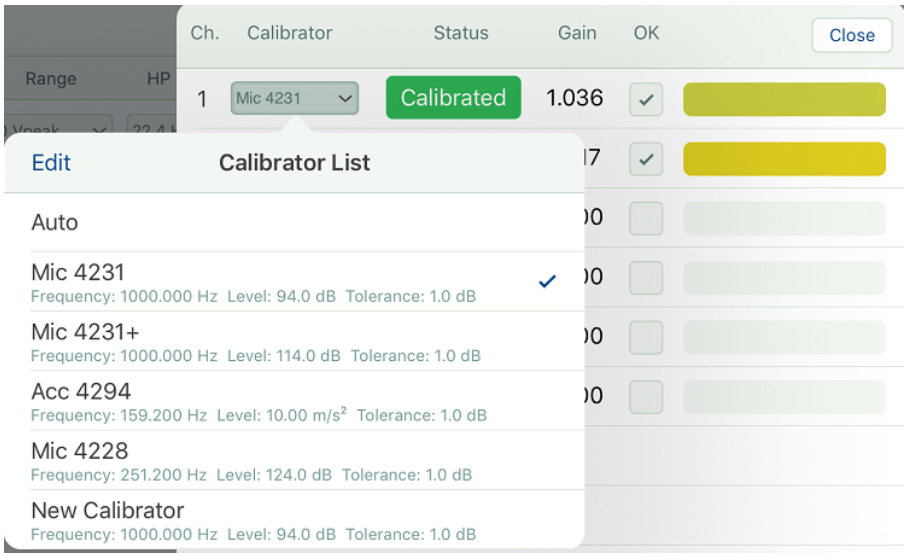


Calibration will then begin automatically, indicated by the red bars (this takes approximately 6 seconds):



Note: The system can calibrate all channels simultaneously, if required. (The figure shows just two.)

A successful calibration is indicated by a green **Calibrated** button, the new Gain factor is displayed in the table and the *OK* checkbox is ticked:



If you want to re-calibrate an individual channel, uncheck the relevant *OK* check-box and the system will automatically re-calibrate that channel.

It is also possible to add a user-defined calibrator, or edit the properties of a calibrator (e.g., to change the level from 94.0 to 94.5 dB for HATS transducers). Simply tap the down arrow next to the *Calibrator* drop-down and add calibrators (or change amplitude tolerances, etc) in the list that appears.

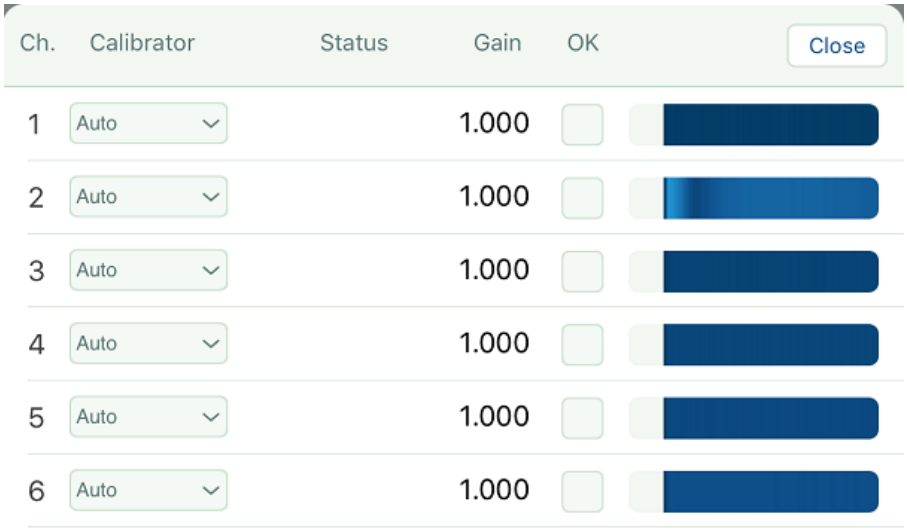
2. When all Calibration is finished, tap the **Close** button and all the checked Gain factors will replace the previous values in the channel settings table.

You are now ready to start recording, see Recording.

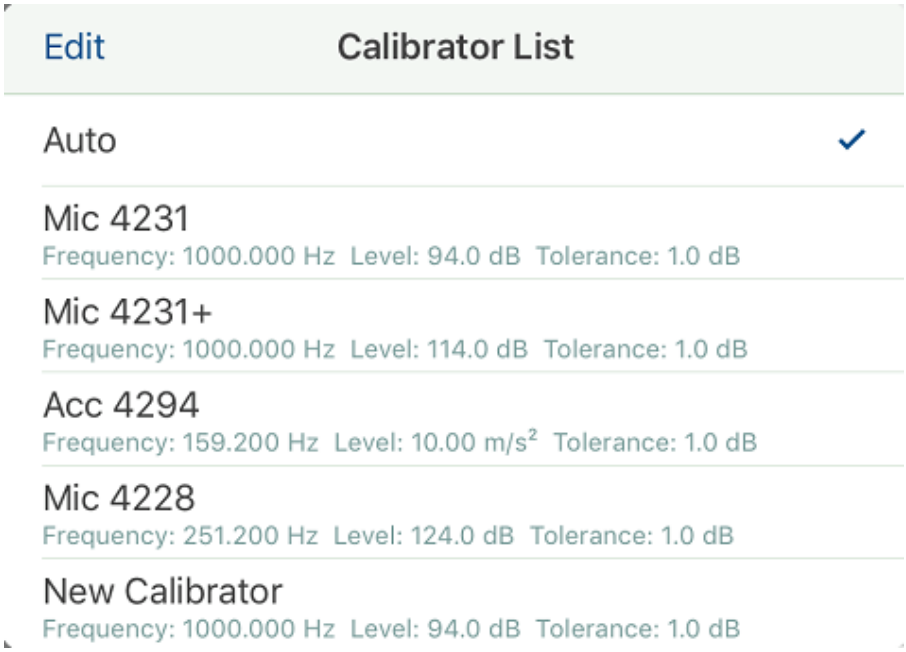
If you want to edit an existing calibrator, define your own Calibrator or calibrate a transducer with unknown sensitivity, click the link.

Editing an Existing Calibrator

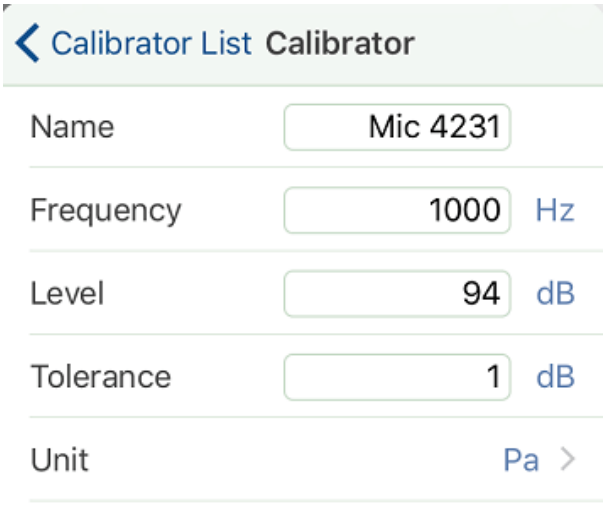
1. From the Calibrator progress dialogue tap the **Auto** calibrator button:



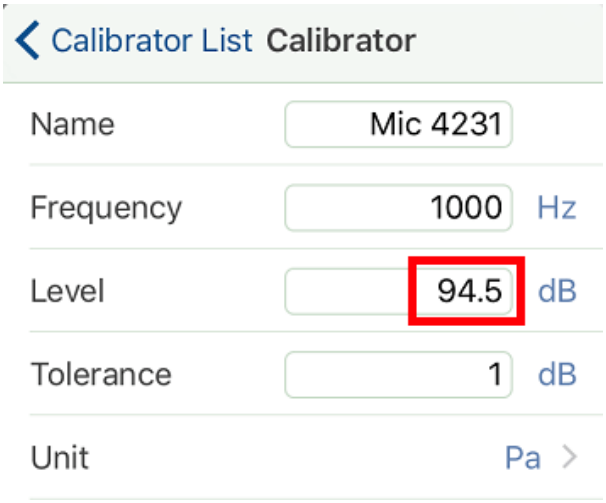
2. Tap **Edit** to edit an existing calibrator and select the calibrator you wish to modify:



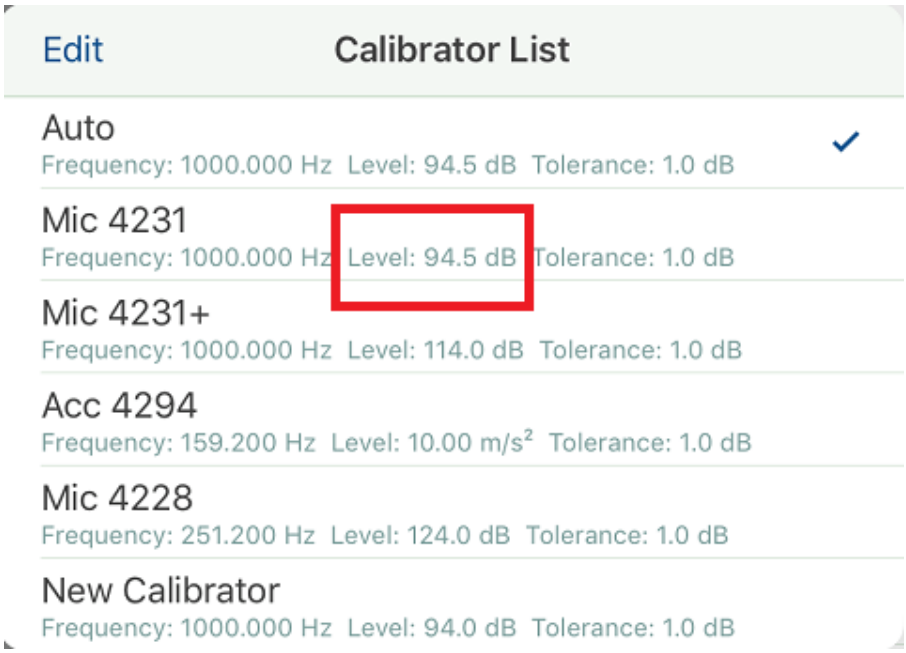
3. This opens a table of editable values:



4. Enter the changes:



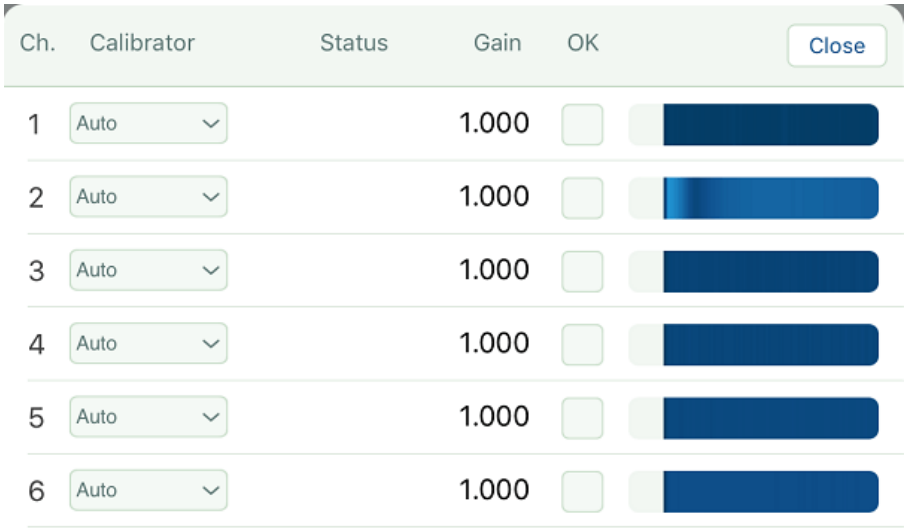
5. Return to the Calibrator list and check the details have changed:



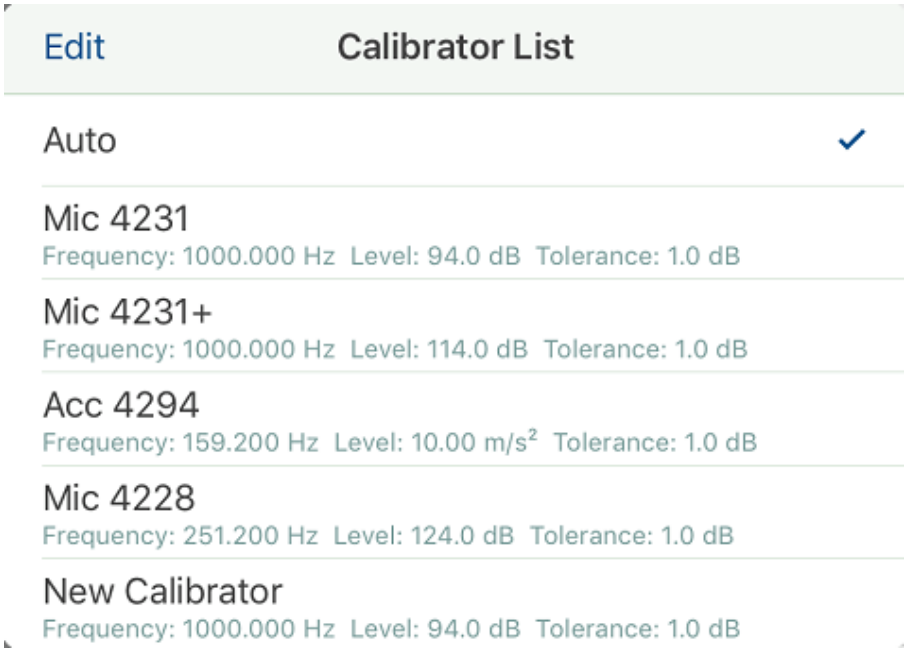
Note: The changes you make to standard calibrators are not stored permanently. They will revert back once you close the Calibration form. If you wish to keep the changes, create a custom calibrator as described in Defining Your Own Calibrator.

Defining Your Own Calibrator

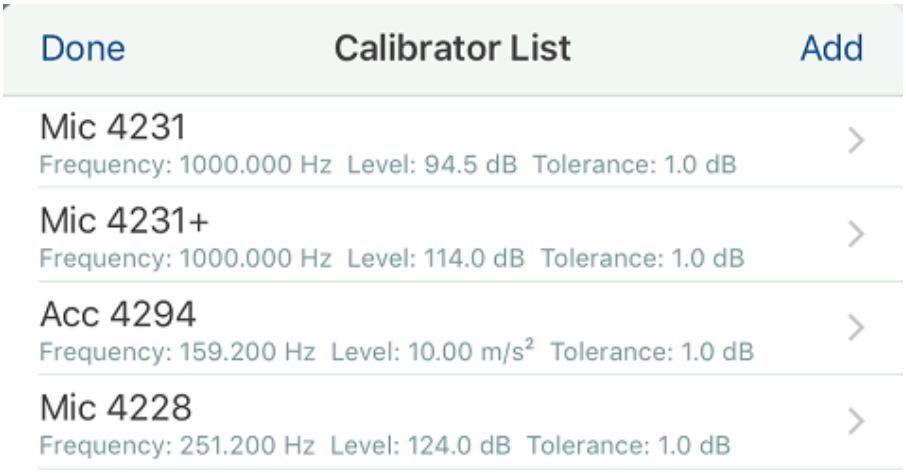
1. From the Calibrator progress dialogue tap the **Auto** calibrator button:



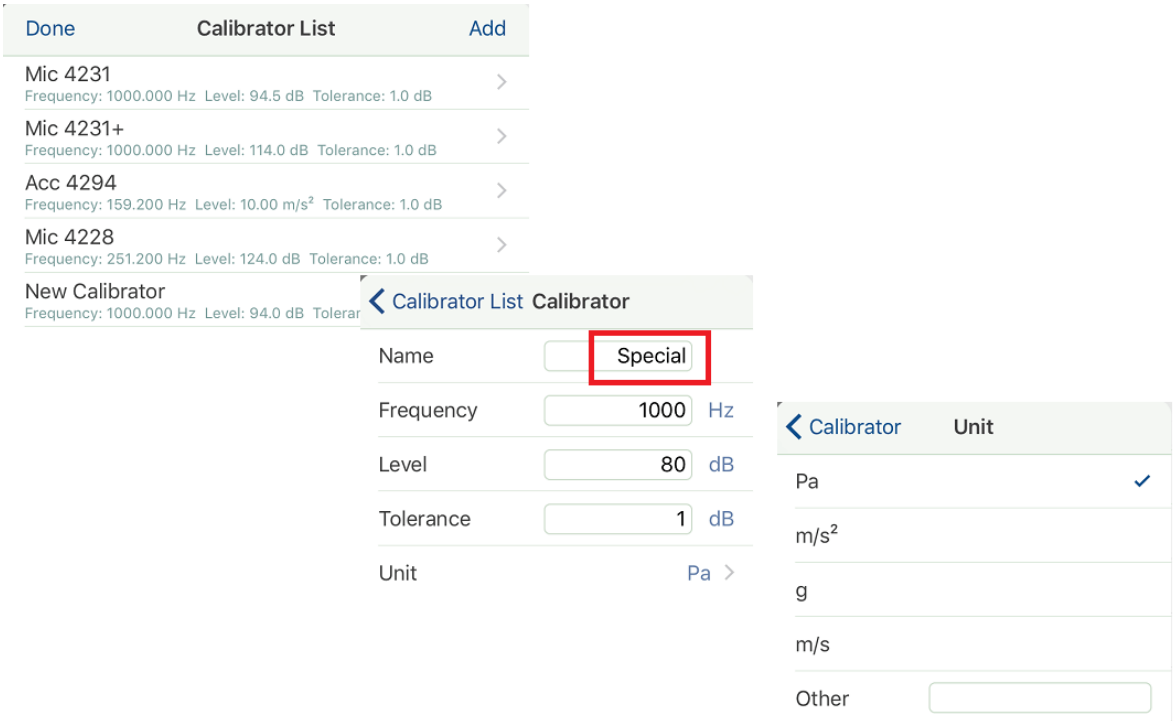
2. Tap **Edit** to enable editing of the calibrator:



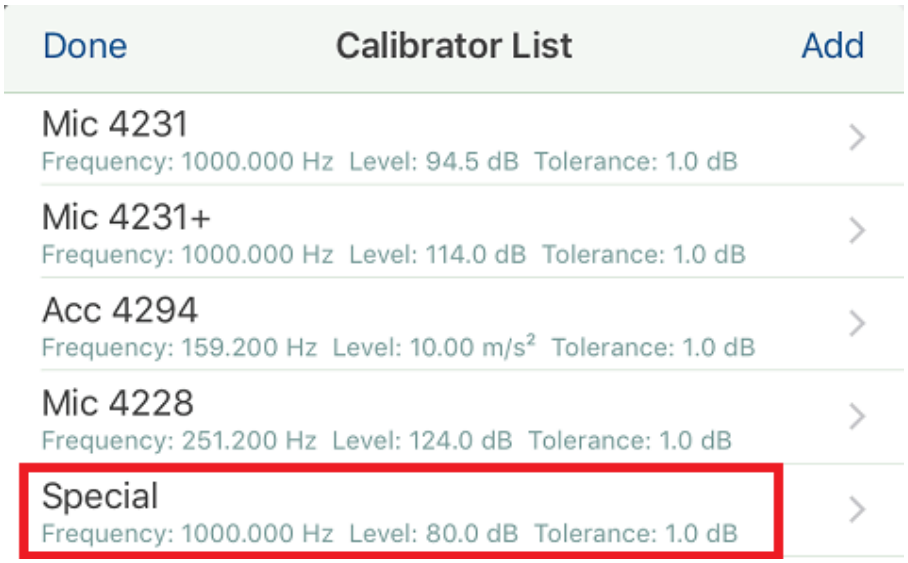
3. Tap **Add** to create a new calibrator:



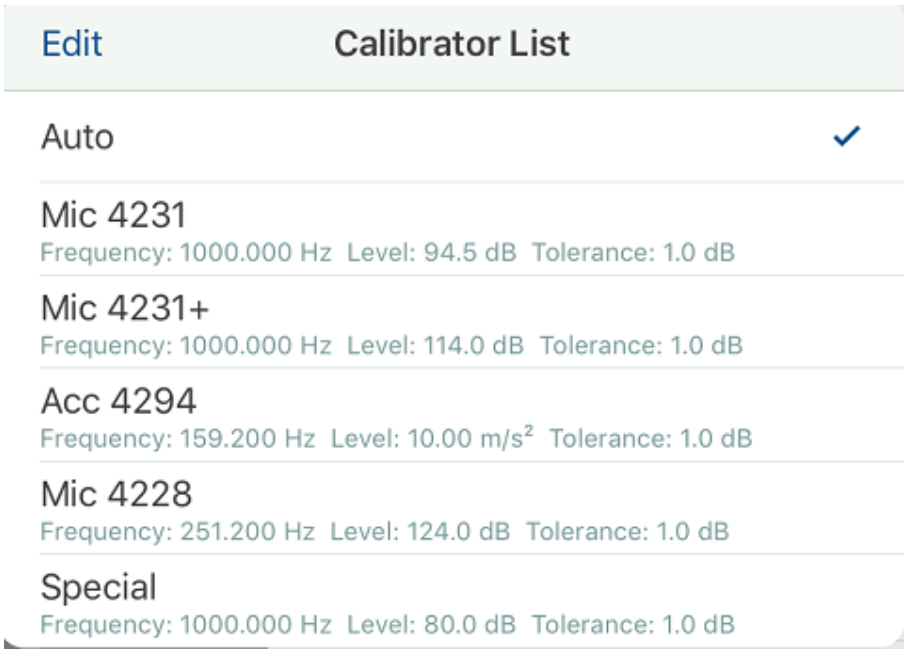
4. Select *New Calibrator* and enter the *Name* and Settings:



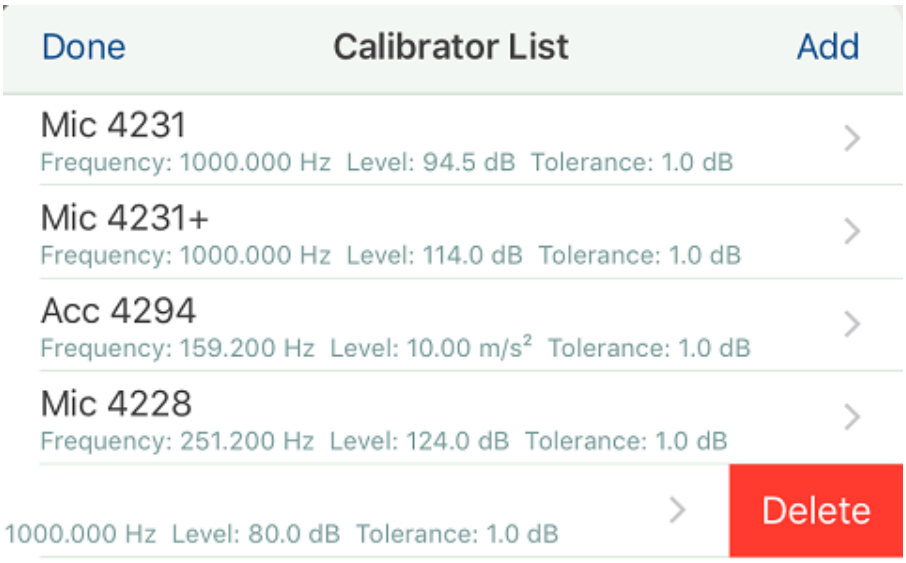
5. Return to the Calibration List where you will see the calibrator you have just created:



6. This is saved in the *global.settings file* and will always appear in the Calibrator list in future:



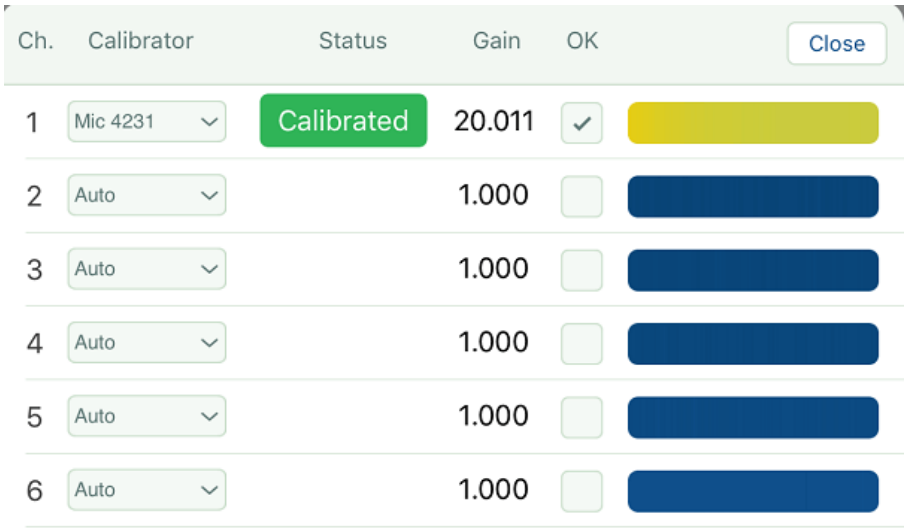
7. You can delete custom calibrators (but not standard calibrators) by swiping to the left over the entry you wish to delete while in Edit mode:


Done
Calibrator List
Add
Mic 4231
Frequency: 1000.000 Hz Level: 94.5 dB Tolerance: 1.0 dB
Mic 4231+
Frequency: 1000.000 Hz Level: 114.0 dB Tolerance: 1.0 dB
Acc 4294
Frequency: 159.200 Hz Level: 10.00 m/s² Tolerance: 1.0 dB
Mic 4228
Frequency: 251.200 Hz Level: 124.0 dB Tolerance: 1.0 dB
1000.000 Hz Level: 80.0 dB Tolerance: 1.0 dB
Delete

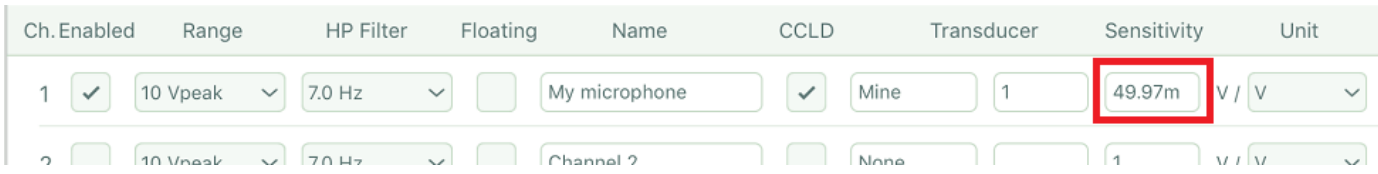
Calibrating a Transducer with Unknown Sensitivity

1. Manually enter the appropriate settings for the transducer in the Channel table. Remember to enter a name and serial number for the transducer and also enter '*1*' for the sensitivity, this is important:

2. Open the Calibration form and select the Calibrator you wish to use. It may Auto calibrate but if this is not what you want to do, select the preferred calibrator, uncheck the *OK* checkbox and it will repeat the calibration with the calibration settings you selected. It will calculate a Gain factor which is 1/Sensitivity:

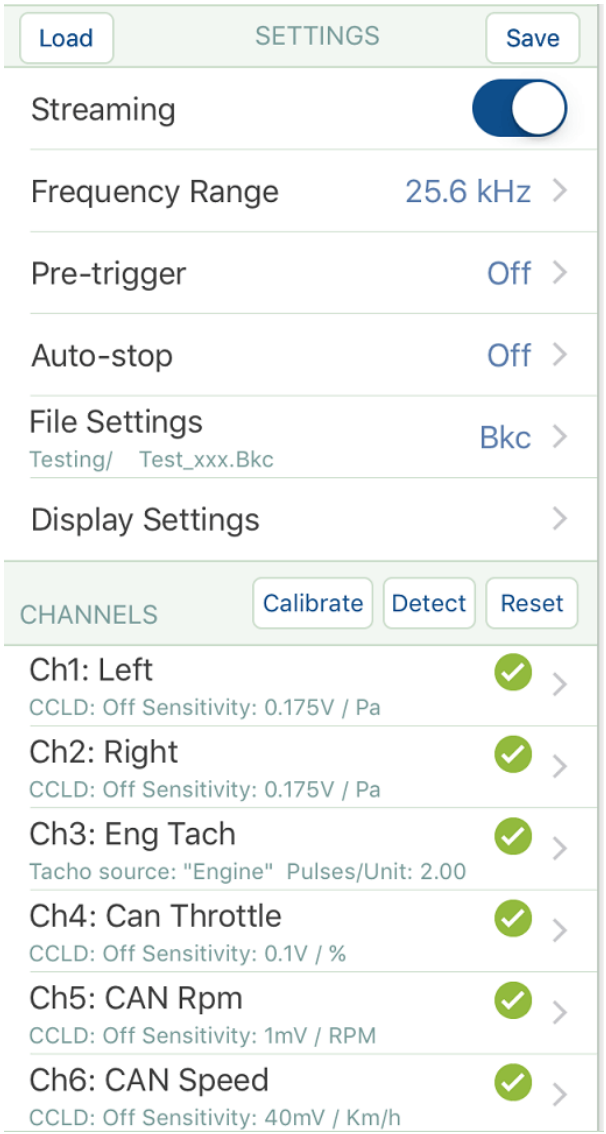


3. When you tap **Close** to close the Calibration form, 1/Gain is entered as the sensitivity in the Channel table and the information is stored in the *front-end.calib* file:

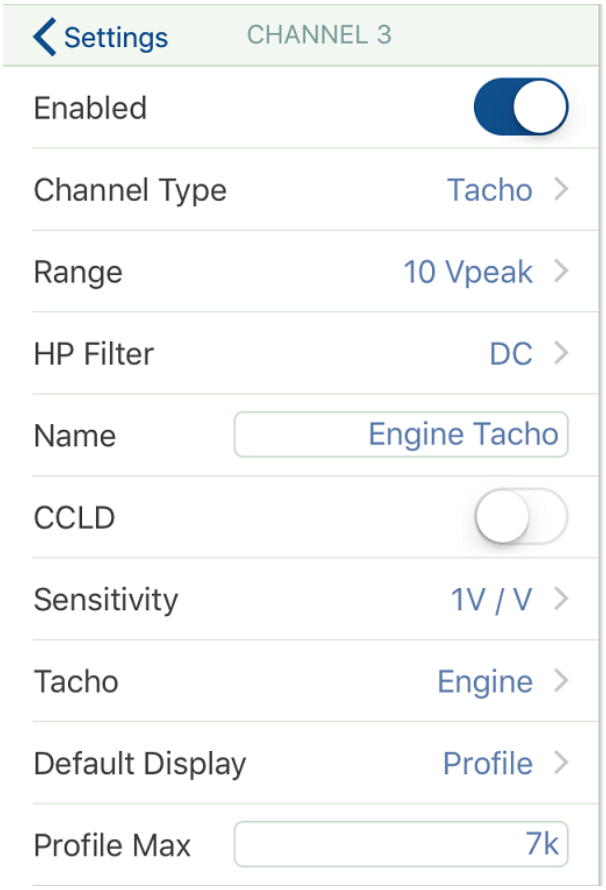


Setting up a Tachometer

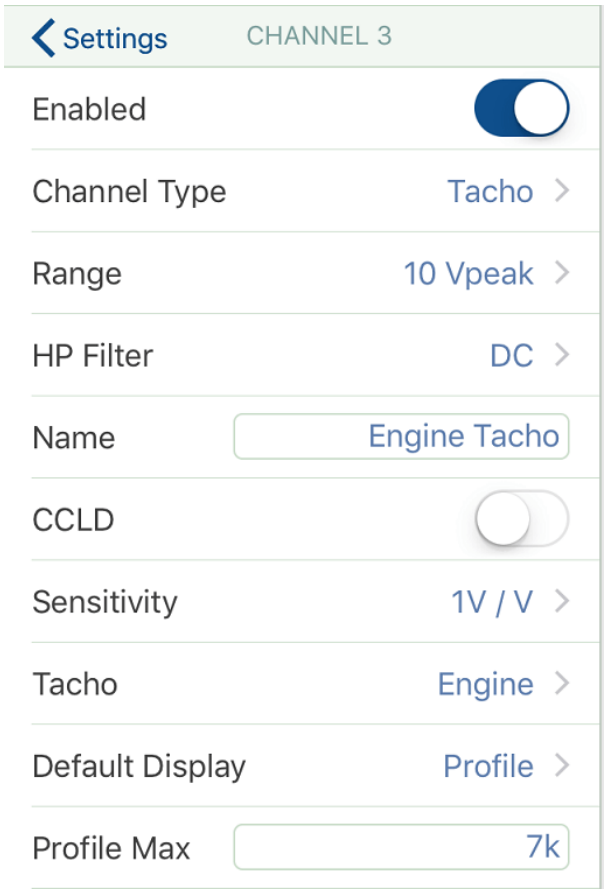
1. Select the channel you wish to assign to a Tacho signal:



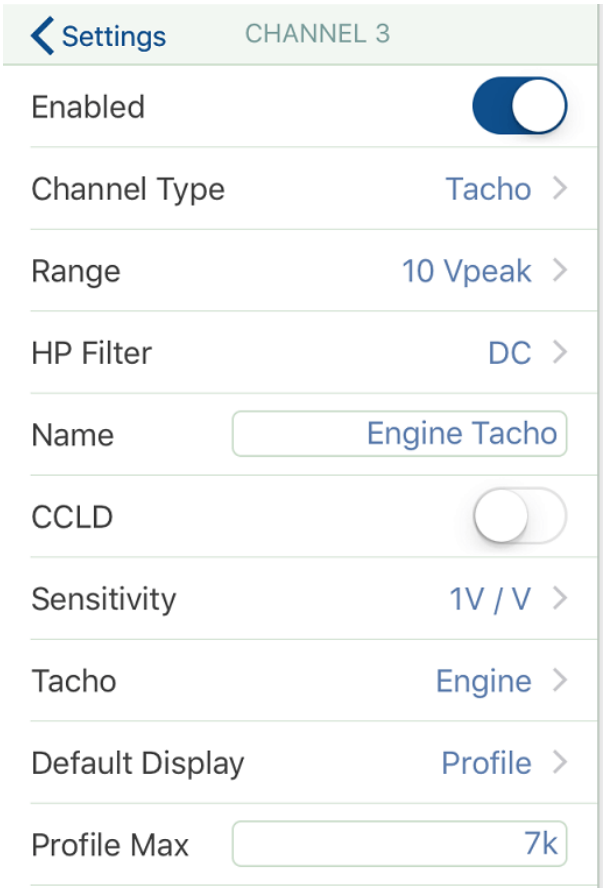
2. Select *Tacho* as Channel Type:



3. Enter a name for the Tacho channel:

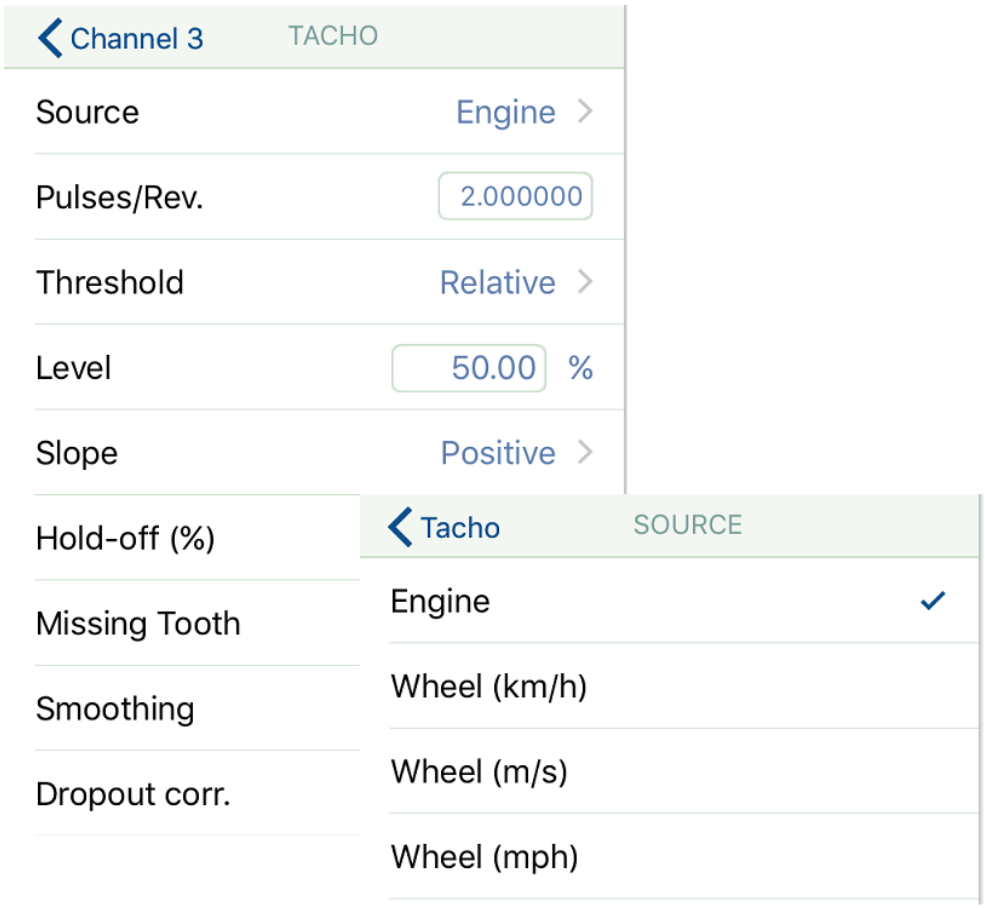


4. Choose the default display type and the maximum value for the profile display:

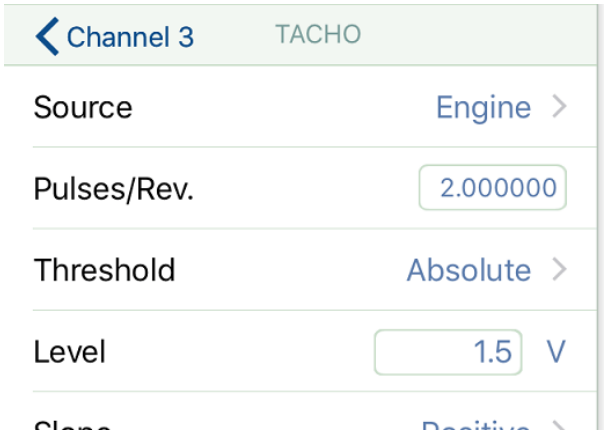


   Real-time data will be displayed from 0 to this value.

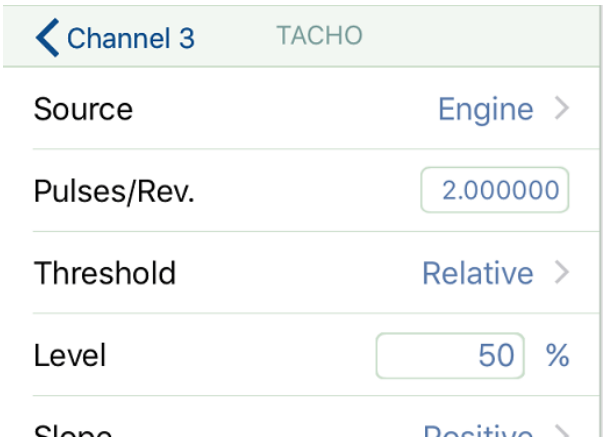
5. Select *Source* type (either engine or wheels), enter the *Pulses/Rev.* (or pulses per distance), and enter the relative trigger *Level*(in % of full range), or absolute value in Volts:



For the Absolute Threshold, enter the Threshold Level in Volts:



For Relative Threshold, enter the threshold level as a percentage of the difference between the maximum and minimum value of the tacho pulse.



The threshold is continuously adapting to match the incoming signal, so if you have a tacho pulse whose amplitude or mean value is continually fluctuating, the threshold line will move up and down in the real-time History display to ensure an optimal triggering.

7. When done, tap Tacho (if applicable) and **Channel X**, then Settings to return to the Settings menu. Swipe to the left to close the Settings menu.

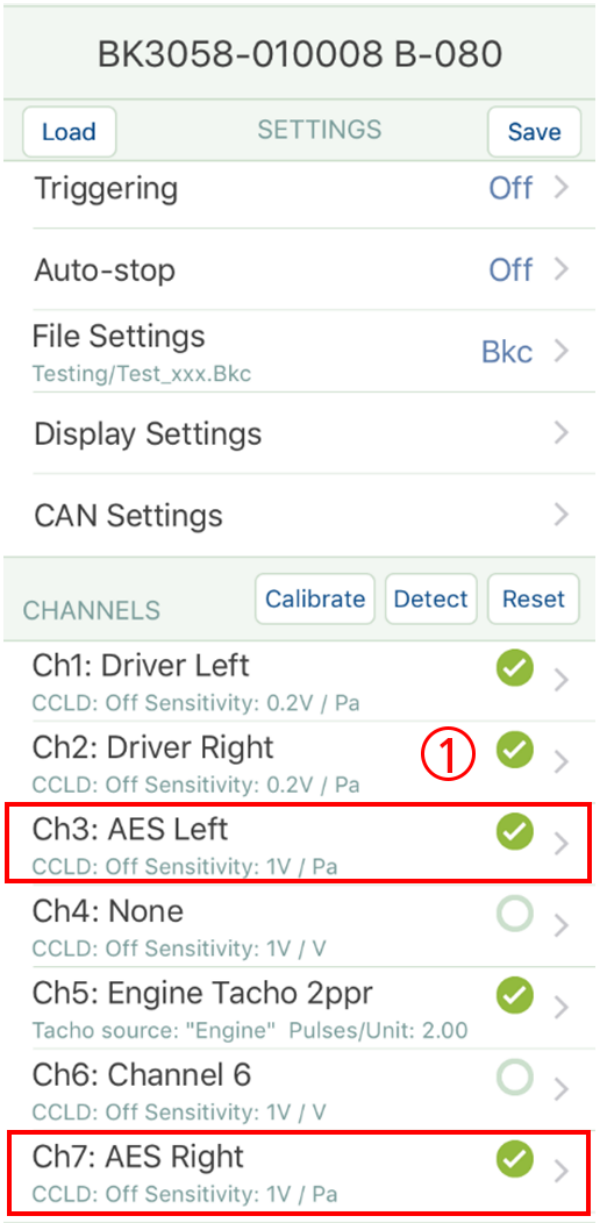
8. If you tap the **Profile** button on a tacho channel, a large digital readout is super-imposed on the real-time profile plot. The numbers are semi-transparent so that the curve can also be seen:

9. If you select *Smoothing* from the Settings menu (see above), the real-time tacho profiles can be smoothed using a simple linear moving average.

   In Pre-recording mode the Smoothing Settings menu can be left open so that you can immediately see the effect of changing the smoothing factor

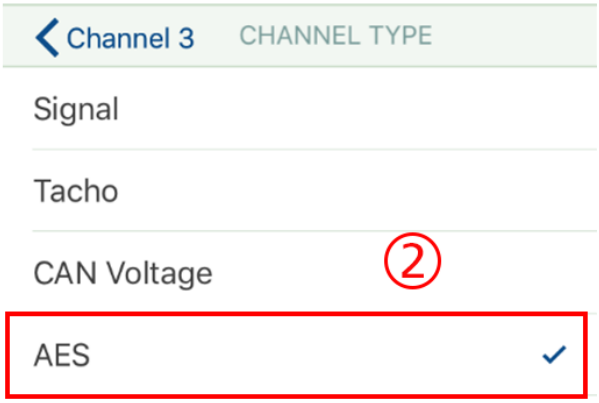
Setting up to Record AES Signals

1. Select the channel you wish to assign as AES.

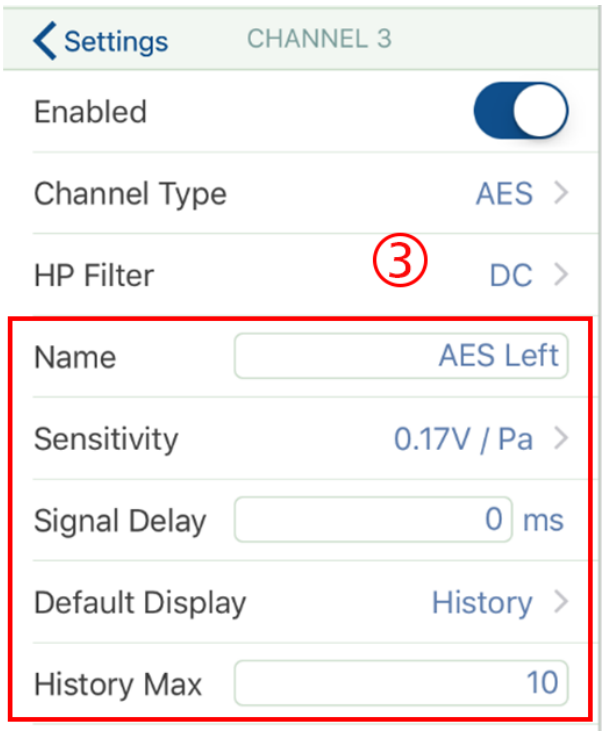


Note: If you are using a digital artificial head you will need to use a pair of input channels

2. Select *Channel Type = AES*.



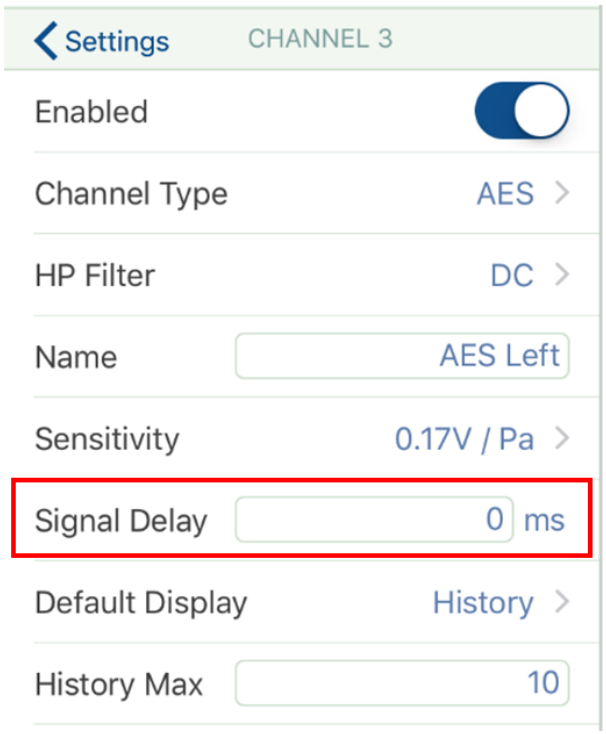
3. Enter a name, sensitivity etc., for the channel.



Most AES transducers (e.g., digital artificial heads) use Analogue-Digital converters to generate the AES signal. This introduces a time delay.

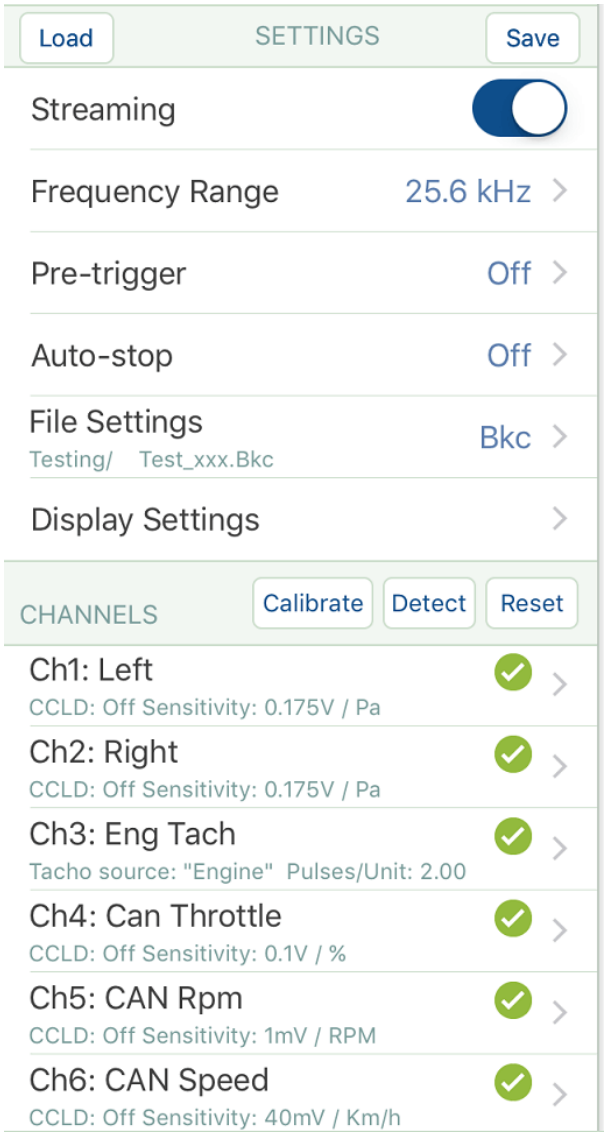
Also, in the Type 3058 LAN-XI module, the incoming digital signals are converted back to analogue voltages which introduces a further delay.

The *Signal Delay* correction is used to time-shift the AES signals so that they are precisely time-aligned with the other analogue channels:

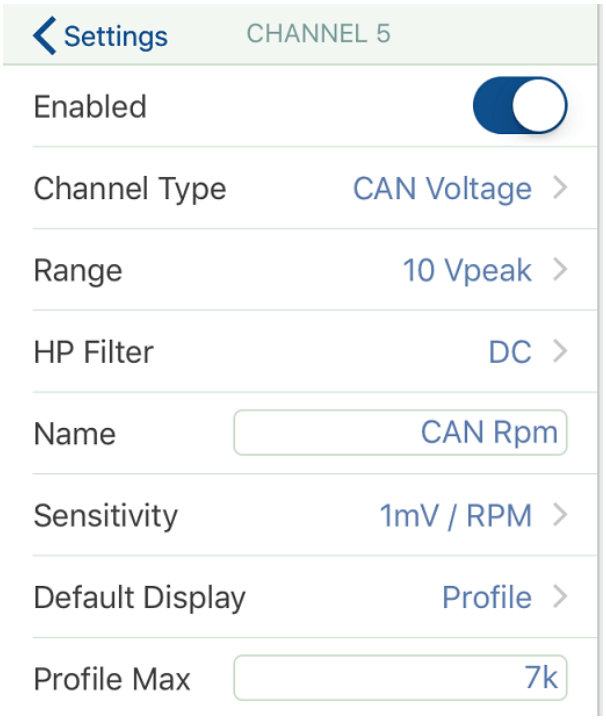

Settings
CHANNEL 3
Enabled
Channel Type
AES
HP Filter
DC
Name
AES Left
Sensitivity
0.17V / Pa
Signal Delay
0
ms
Default Display
History
History Max
10

Setting up a CAN Voltage Channel

1. Select the channel you wish to assign to a CAN Voltage:



2. Select *CAN Voltage* as Channel Type, enter a name for the channel, choose the default display type and enter the maximum value for the profile display:



Real-time data will be displayed from 0 to the Profile Max value.

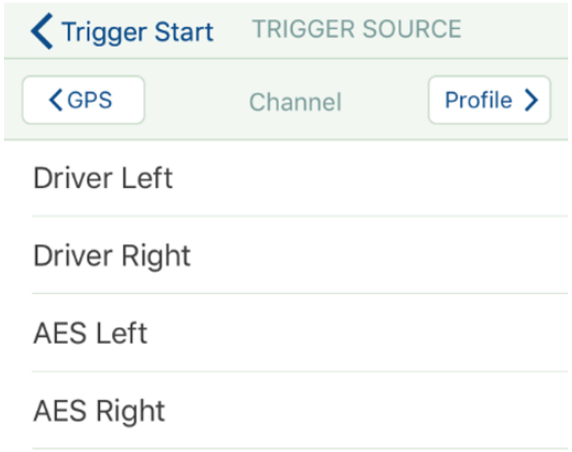
Enter the sensitivity in Volts per Unit - this calibration factor is dependent on the device you use to convert CAN messages to analogue signals. (For example, if you are using the 4-ch. CAN to Analogue Converter ZH-0700, it has its own calibration procedure which produces the correct sensitivity to enter in this field.)

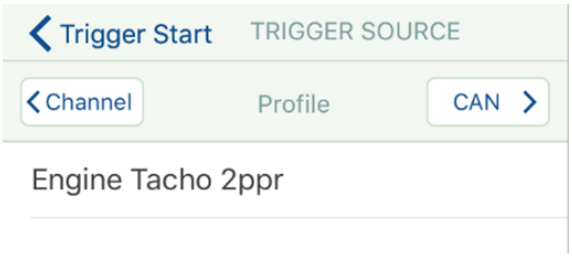
Setting up Triggering

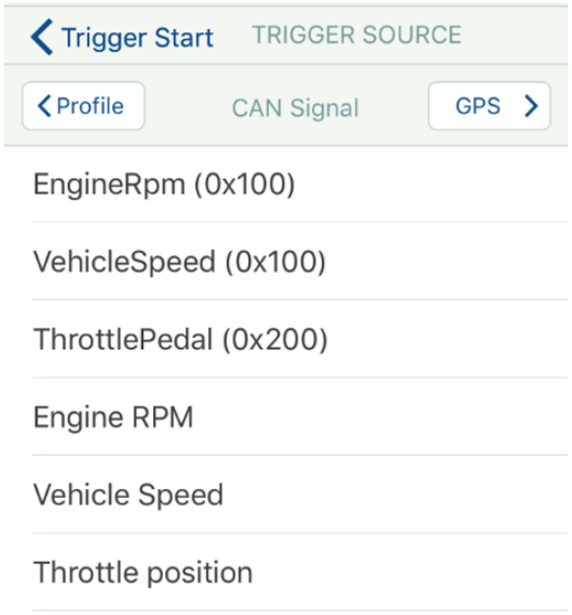
Sonoscout has very flexible triggering functionality where the Start Trigger and End Trigger thresholds can be defined using **any combination** of the following:

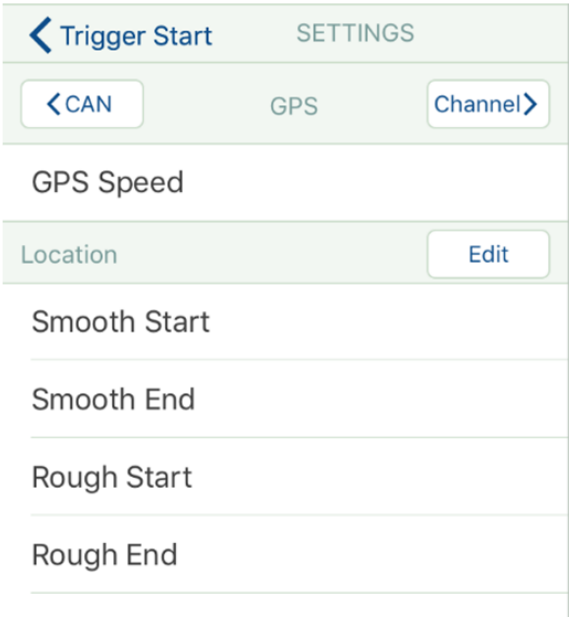
- Manual
- The level of a signal channel
- The level and slope of a profile measured using a tacho (or CAN-voltage converter)
- The level and slope of any CAN bus signal
- The level and slope of the speed profile measured using the built-in GPS
- The Location (i.e., latitude and longitude) measured using the built-in GPS, or from Google Maps

Here are some triggering examples:



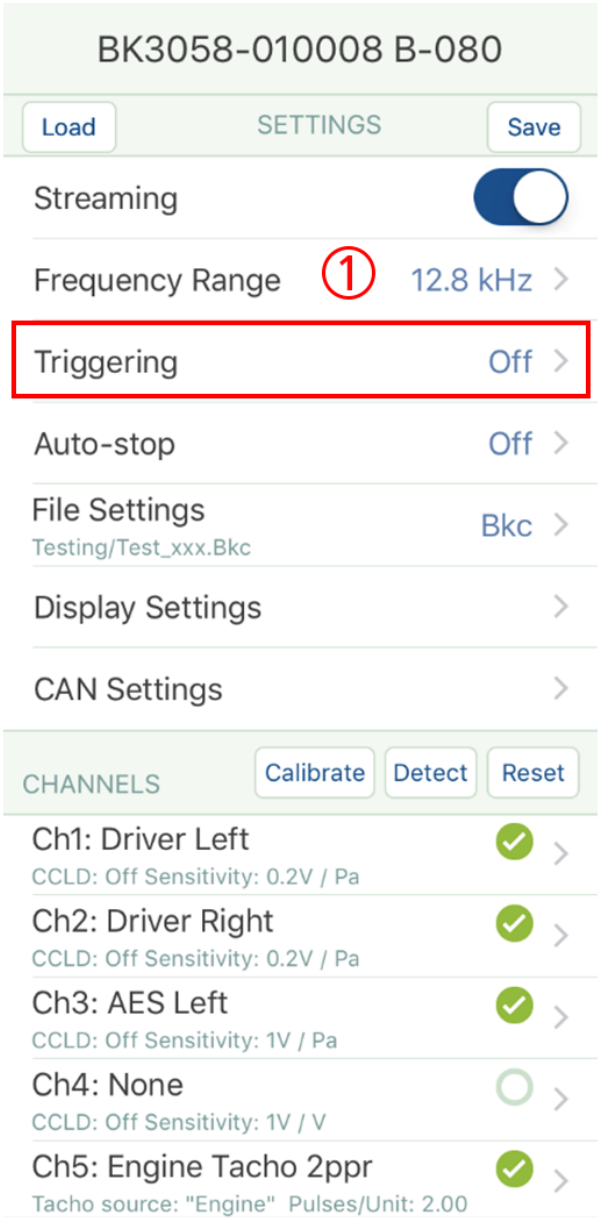




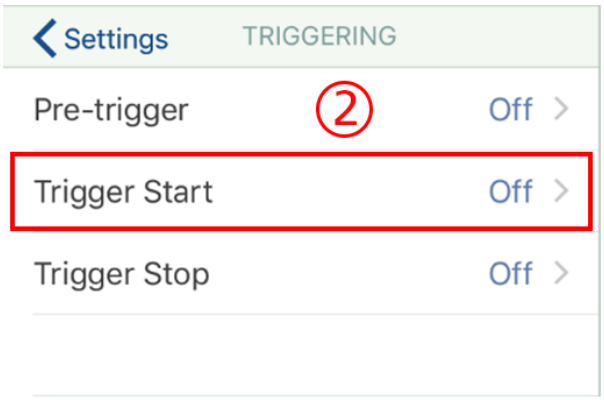


Setting up a Trigger Sequence

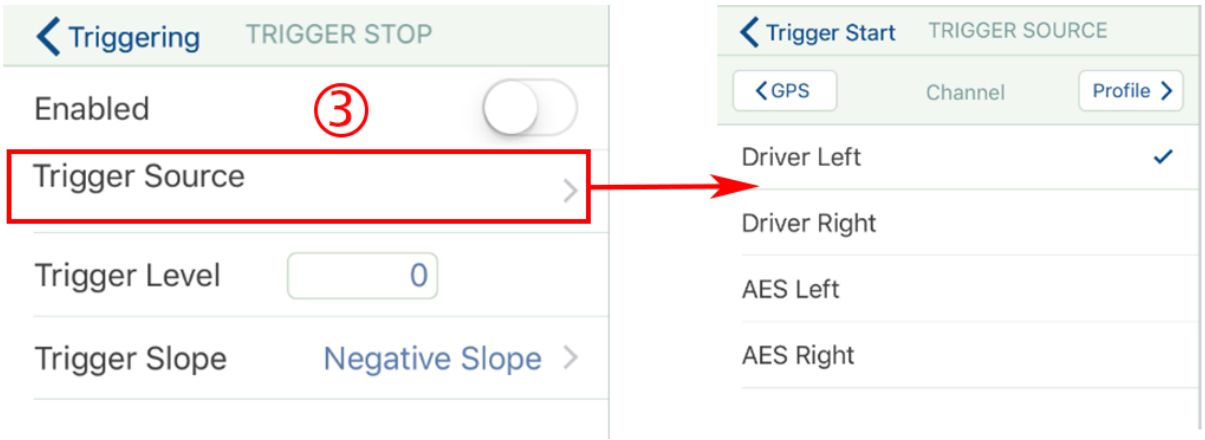
1. Tap the *Triggering* option.



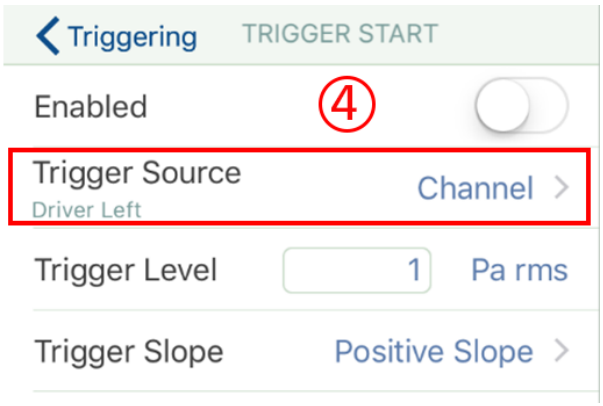
2. Choose which trigger to set up, Start or Stop.



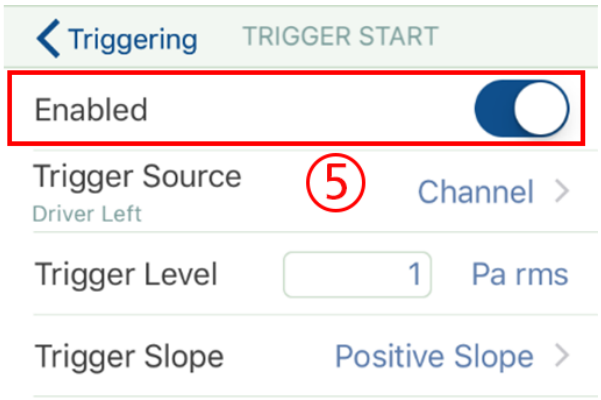
3. Tap *Trigger Source* and select the trigger signal from the list of those available in your current recording setup.



4. Enter the triggering parameters. These will depend on the trigger source type you have selected. In this example, a signal channel has been chosen so the only entry is the threshold level in engineering units.



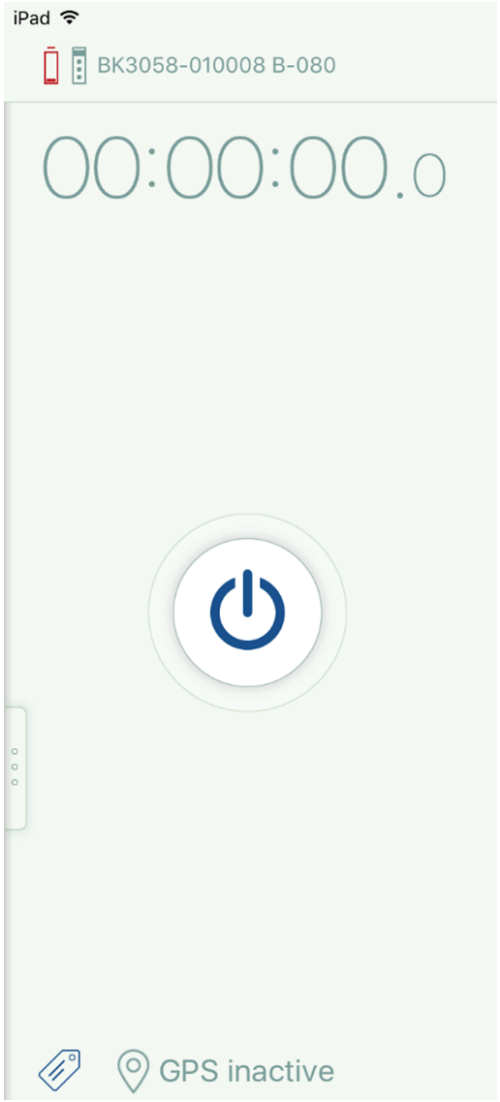
5. You can enable the trigger in the panel.



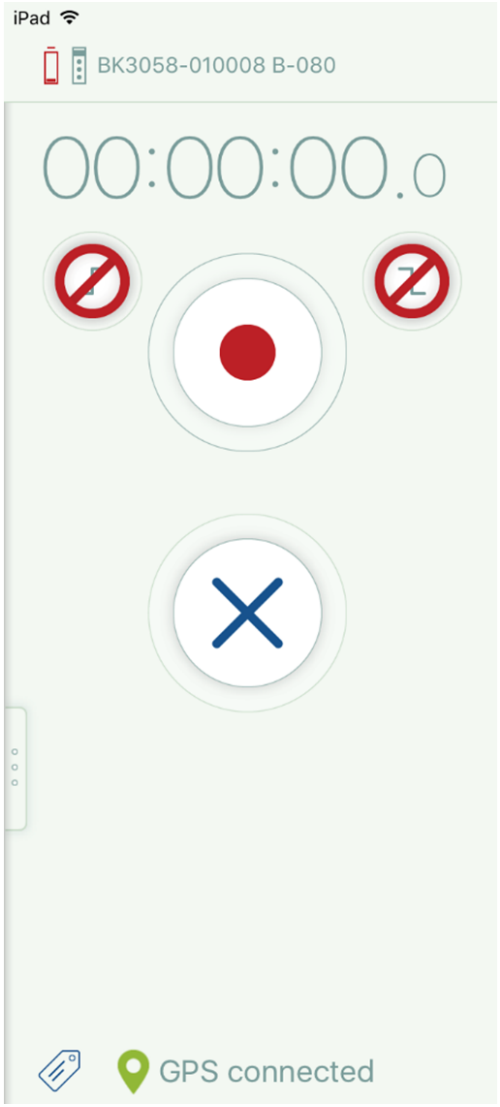
However, it is recommended that you leave it in disabled mode as it is more convenient to enable it in real-time as described below.

Running a Recording Sequence with Triggers

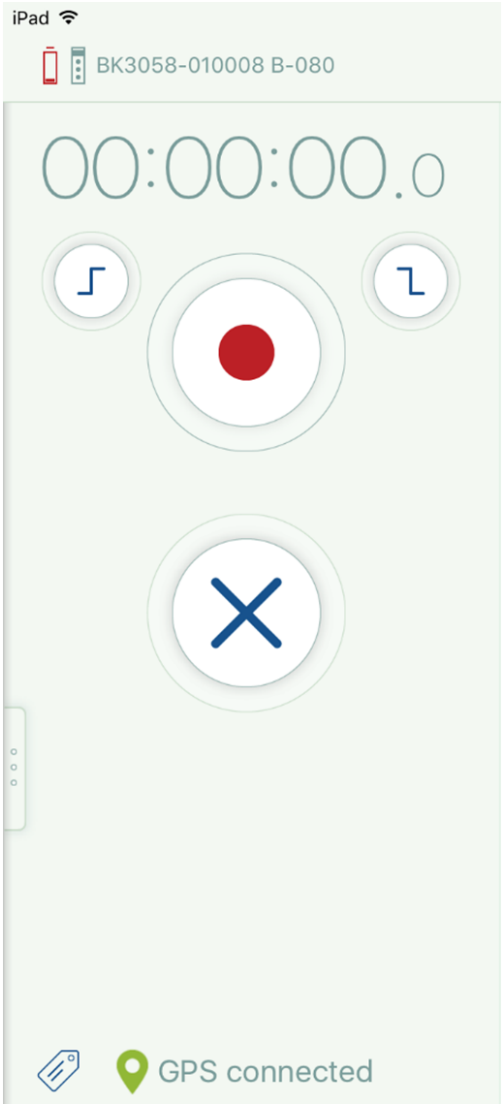
1. Start Pre-recording, tap .



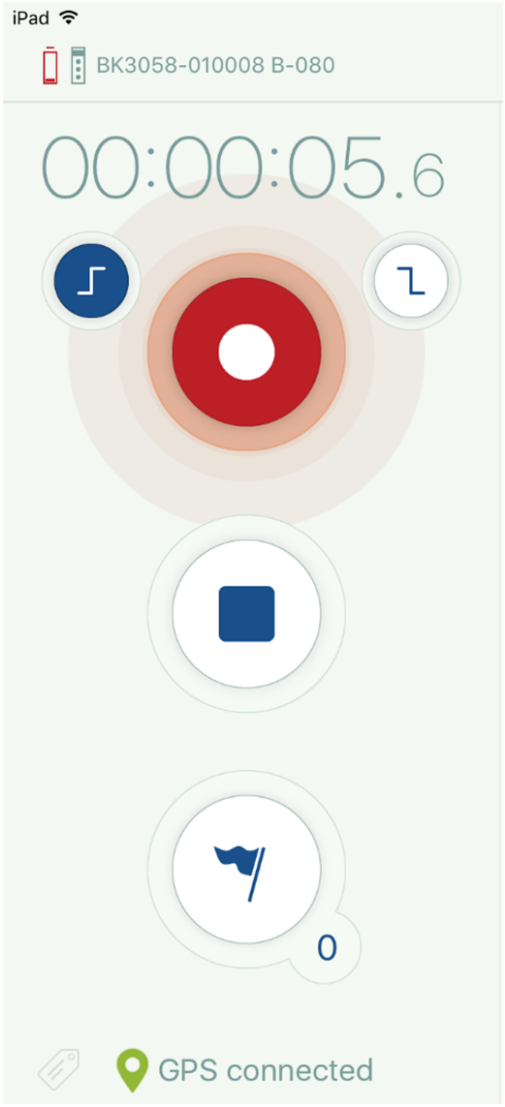
2. Triggers disabled. Tap to enable.



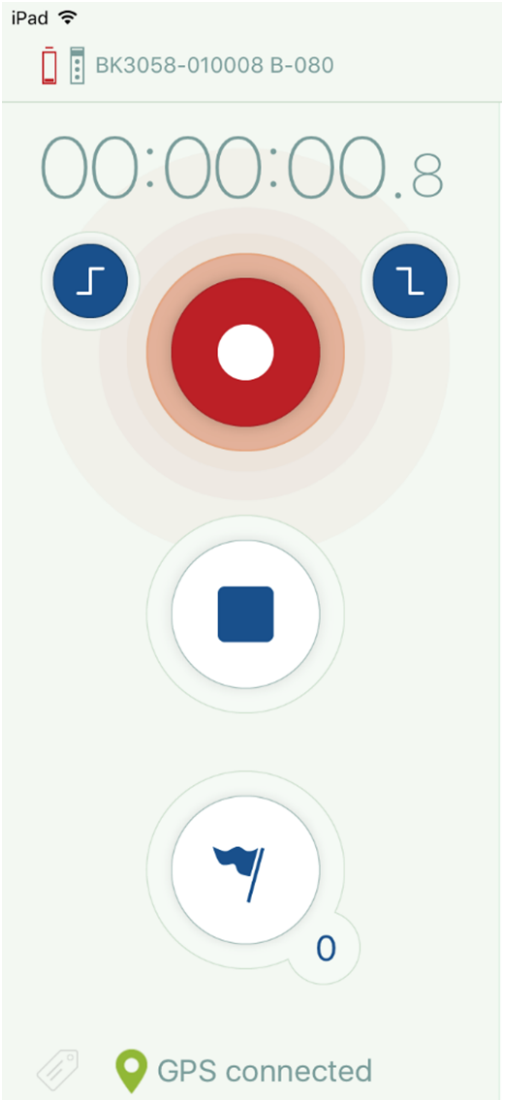
3. Triggers enabled.



4. Start triggered.



5. Stop triggered.

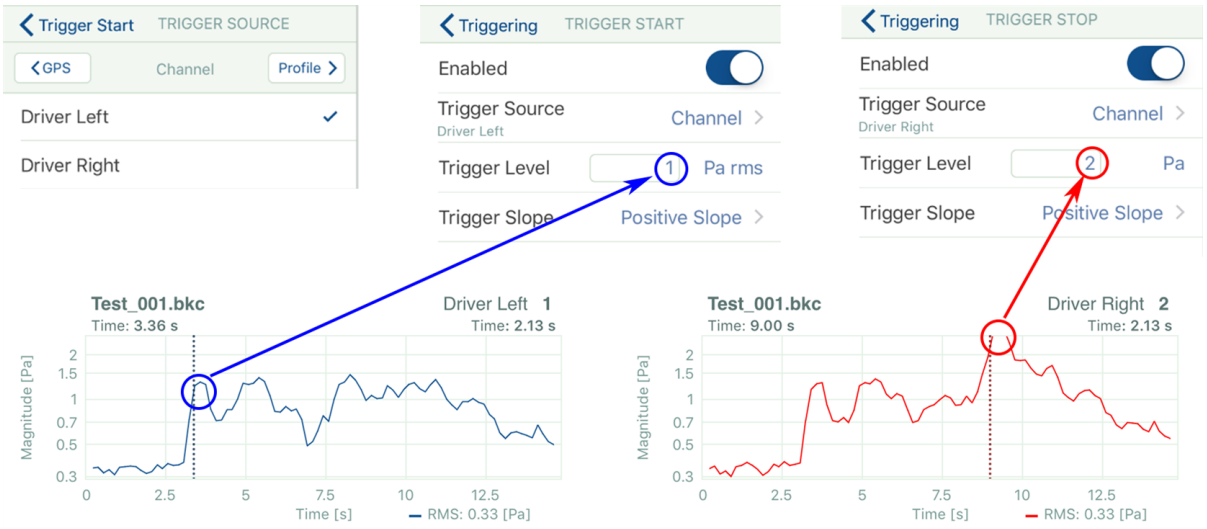


Note: There is a short delay before the triggers are re-armed. This should give you enough time to disable them if required.

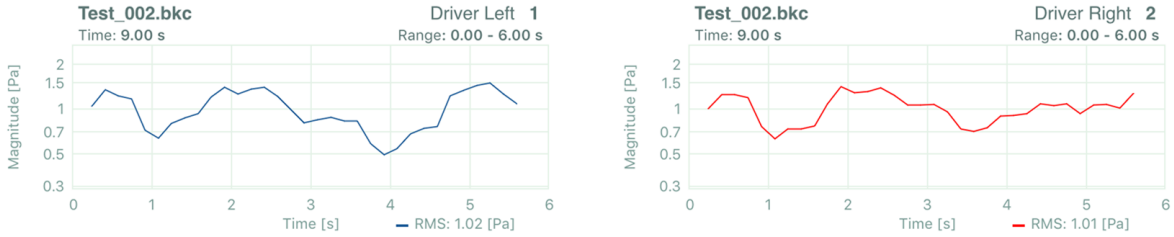
Using a Signal Channel as the Trigger

1. In this case, the Trigger Level is a threshold i.e., triggering will occur if the level crosses the specified value with the selected slope. The level is calculated as the RMS (over 125 ms) rather than the instantaneous Peak.

2. In the example below, signal Channel 1 was used for the Start Trigger and –Signal Channel 2 for the Stop.

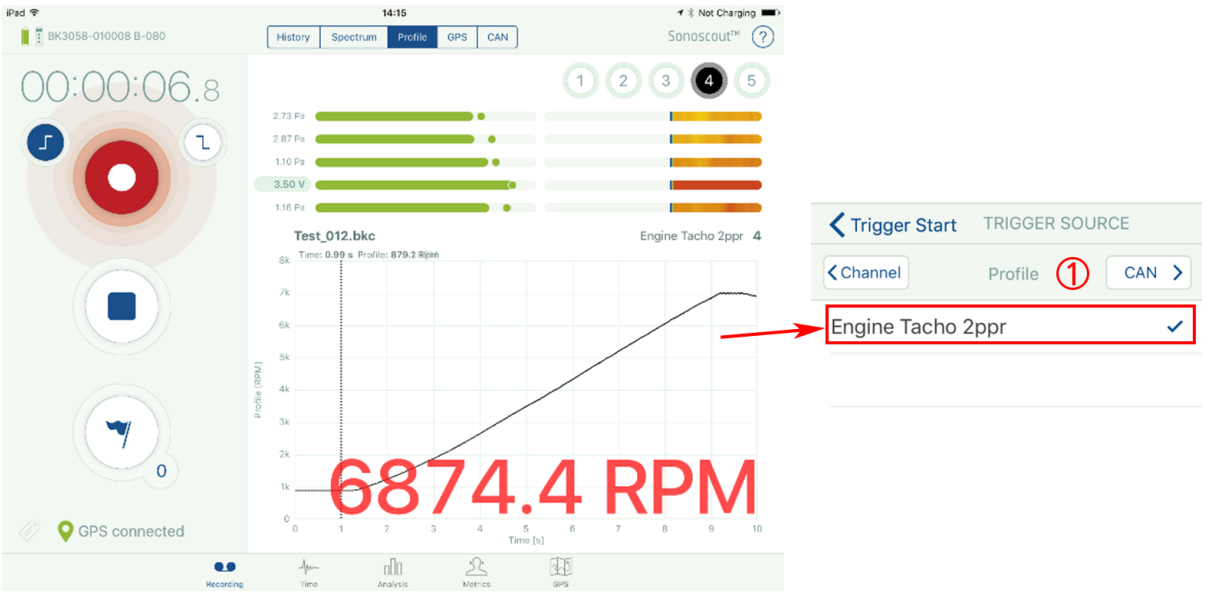


3. The graphs below show the Overall Level vs. Time for the two channels without triggering (upper) and with triggering (lower).

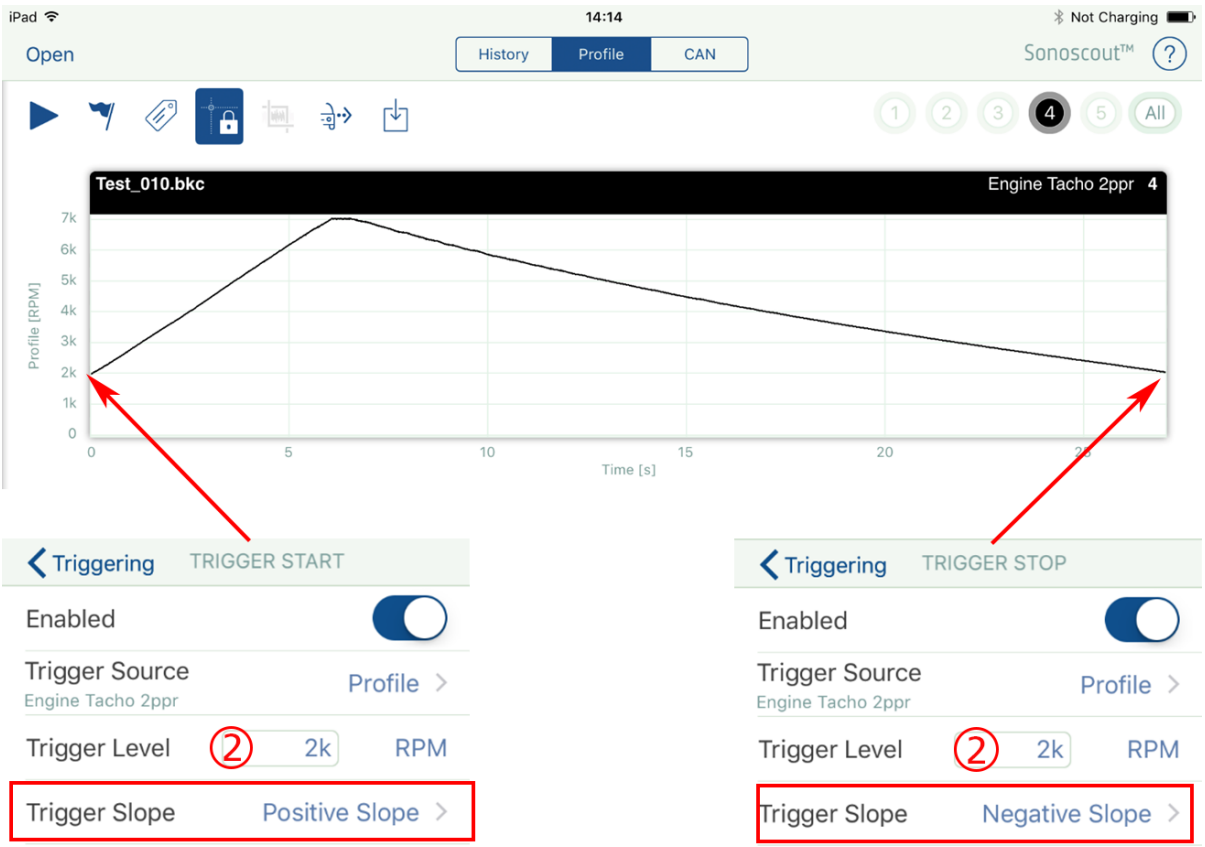


Using a Profile as a Trigger

1. In this example the RPM Profile from a tacho signal is used to control the triggering.

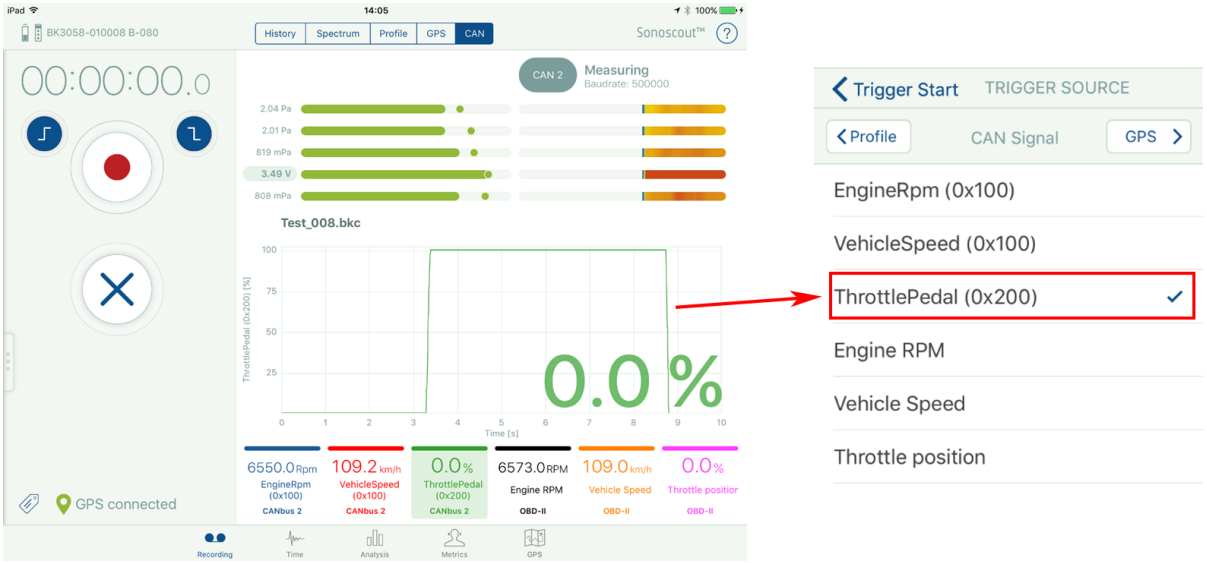


2. The Start is triggered using a Positive slope and the Stop by a Negative slope so that the run-up and run-down are recorded in one file.

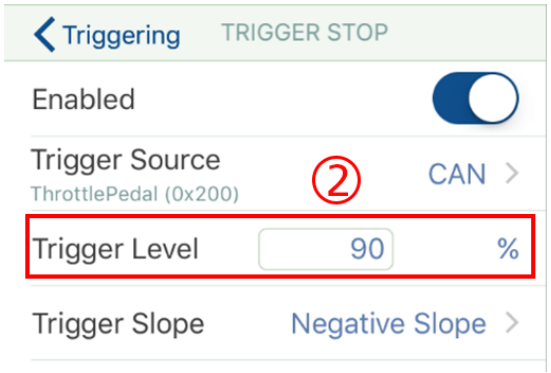


Using a CAN Signal as a Trigger

1. In this example the throttle pedal CAN bus signal is used to trigger the recording.

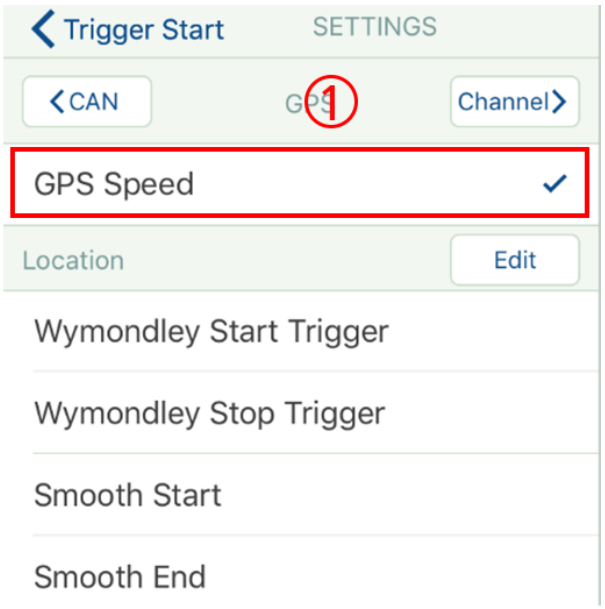


2. The values are set to + and – 90%, which is a very convenient way to capture a wide open throttle recording.

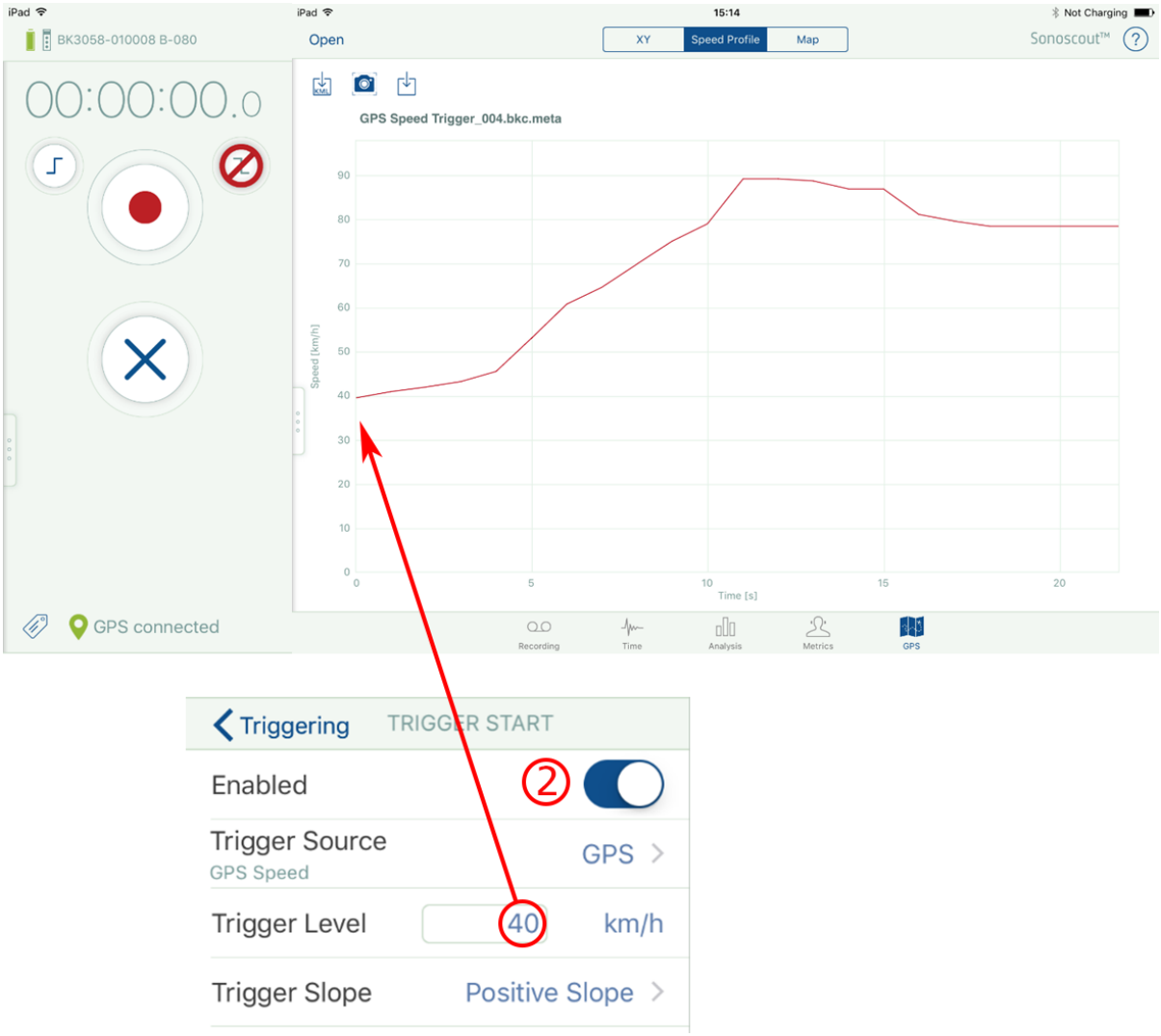


Using GPS Speed as a Trigger

1. A GPS Speed trigger is set up in the same way as any other Profile.



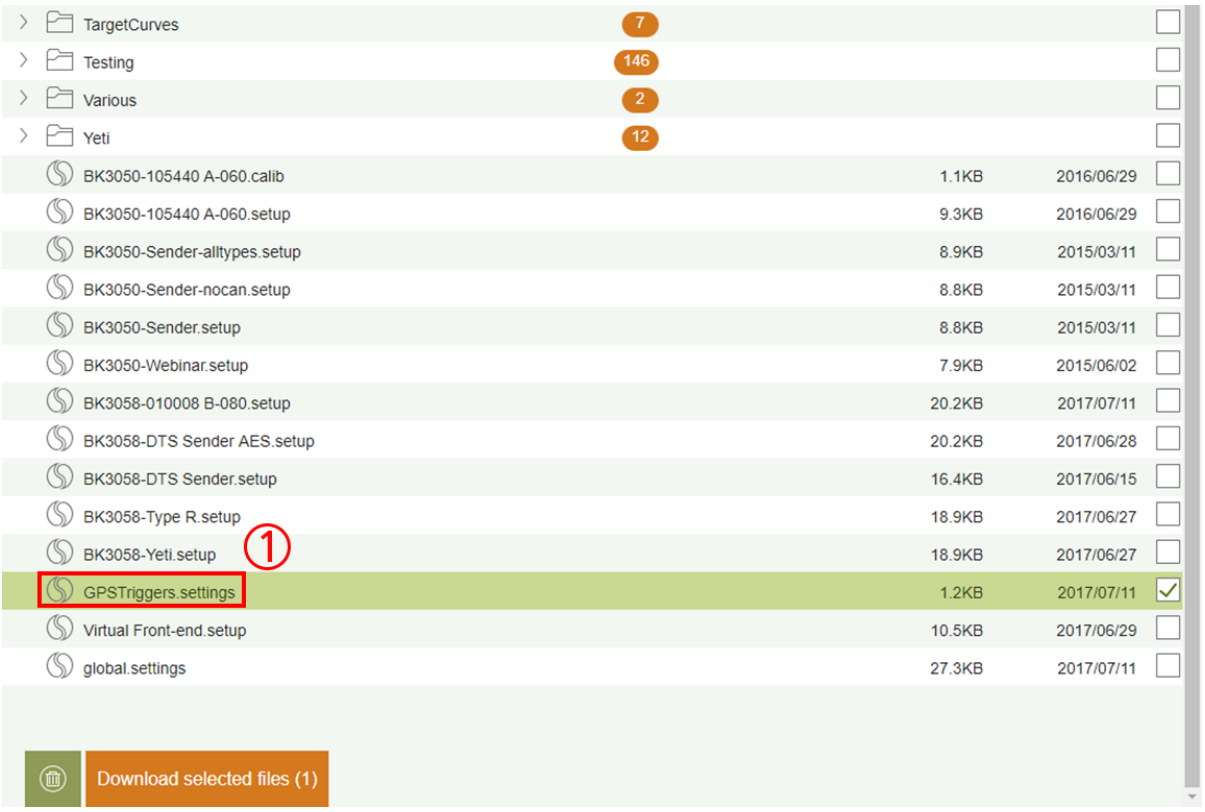
2. In this example the GPS Speed trigger was used to start the recording and it was stopped manually.



Note: You can change the GPS Speed units in the Display Settings menu.

Using GPS Location as a Trigger

1. Sonoscout uses a configuration file called *GPSTriggers.settings*.

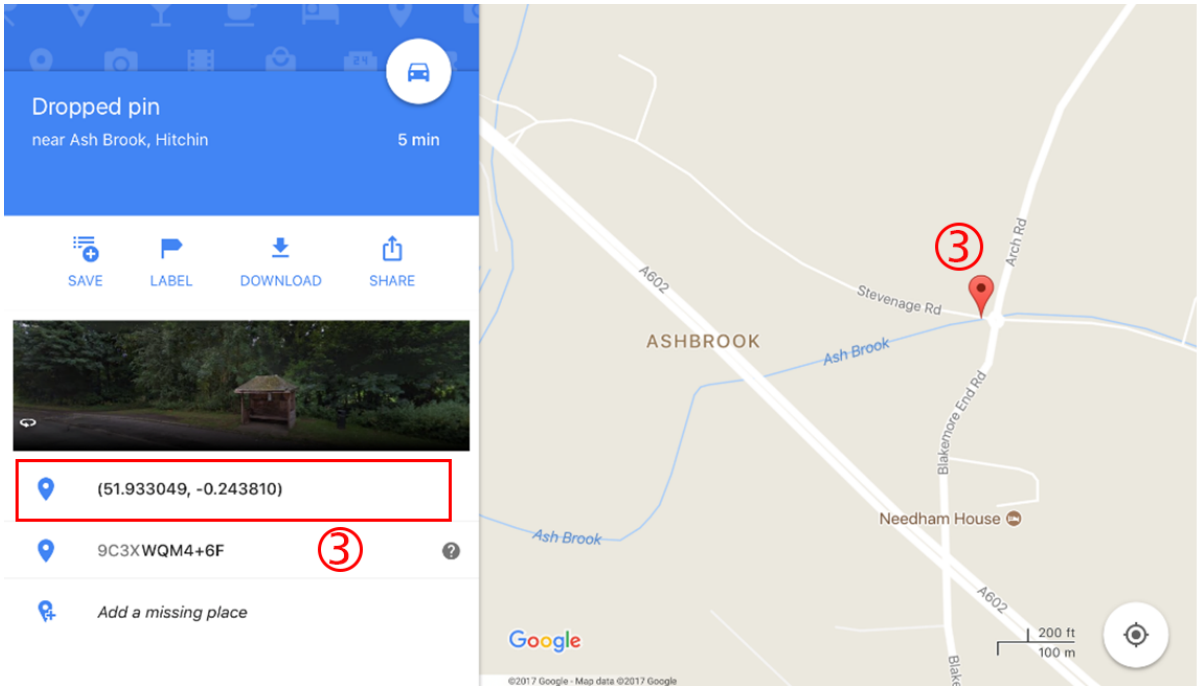


2. This is a simple XML file which you can edit to enter your own latitude, longitude and radius (i.e., tolerance in metres) values.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE plist PUBLIC "-//Apple//DTD PLIST 1.0//EN"
"http://www.apple.com/DTDs/PropertyList-1.0.dtd">
<plist version="1.0">
<dict>
      <key>GPSTriggers</key>
      <array>
            <dict>
                  <key>description</key>
                  <string>My Trigger</string>
                  <key>latitude</key>
                  <real>51.93313611</real>
                  <key>longitude</key>
                  <real>-0.24452499999999999</real>
                  <key>radius</key>
                  <real>10</real>
            </dict>
      </array>
</dict>
</plist>
```

②

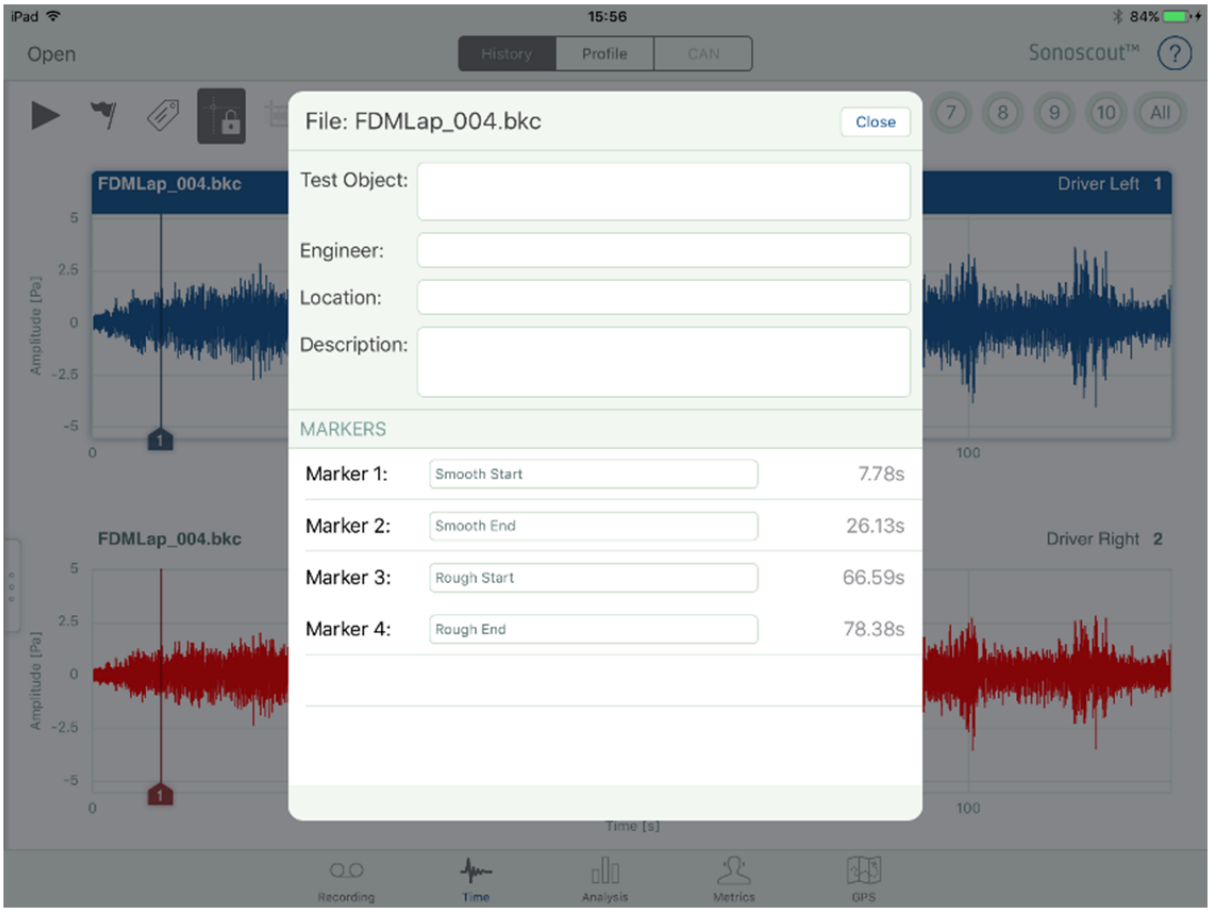
3. You can obtain the latitude and longitude values by dropping a pin in Google Maps.



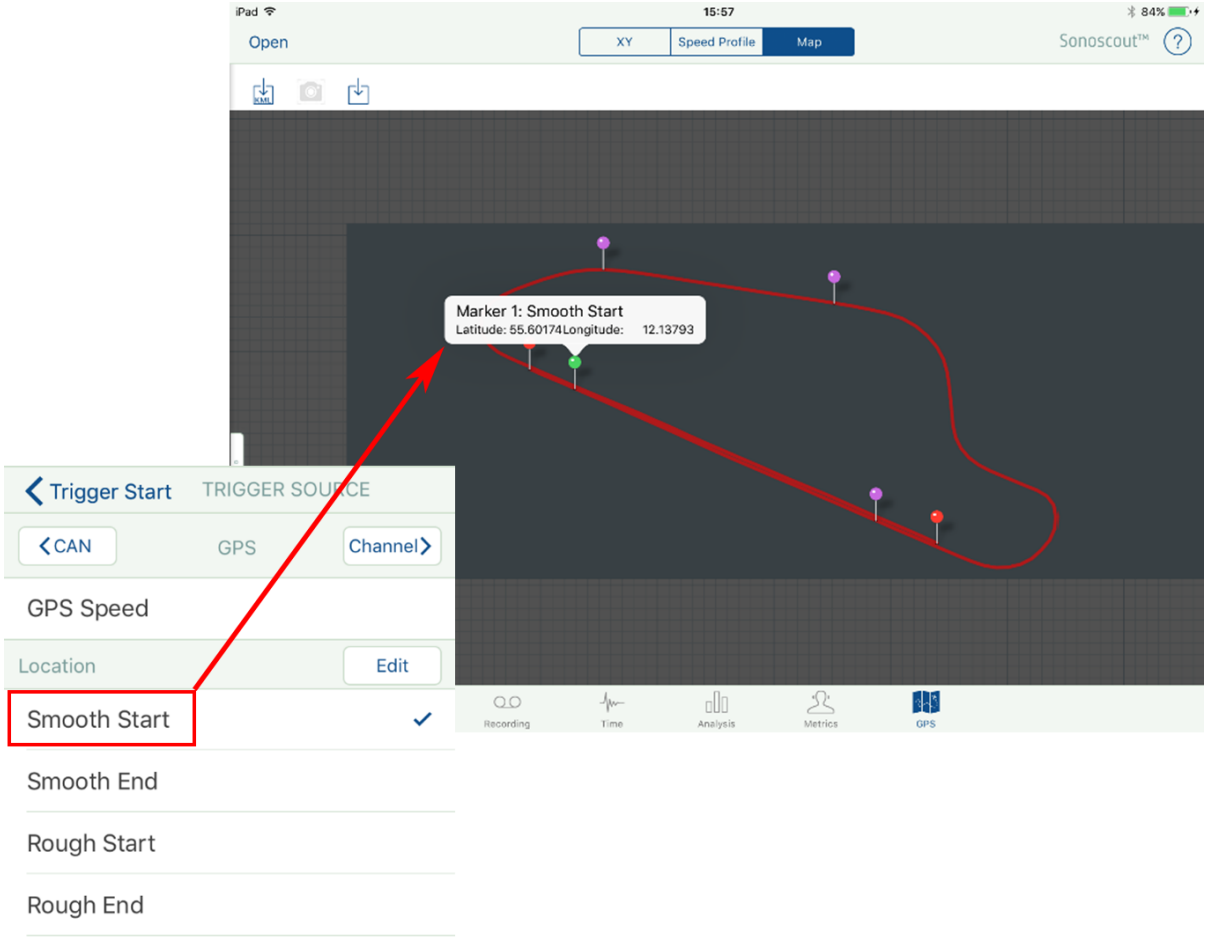
It is possible to create *GPSTriggers.settings* directly in Sonoscout.

4. Make a recording of a route containing several road sections where you would like to trigger starting or stopping the recording. Use Markers to define potential Start and Stop trigger locations.

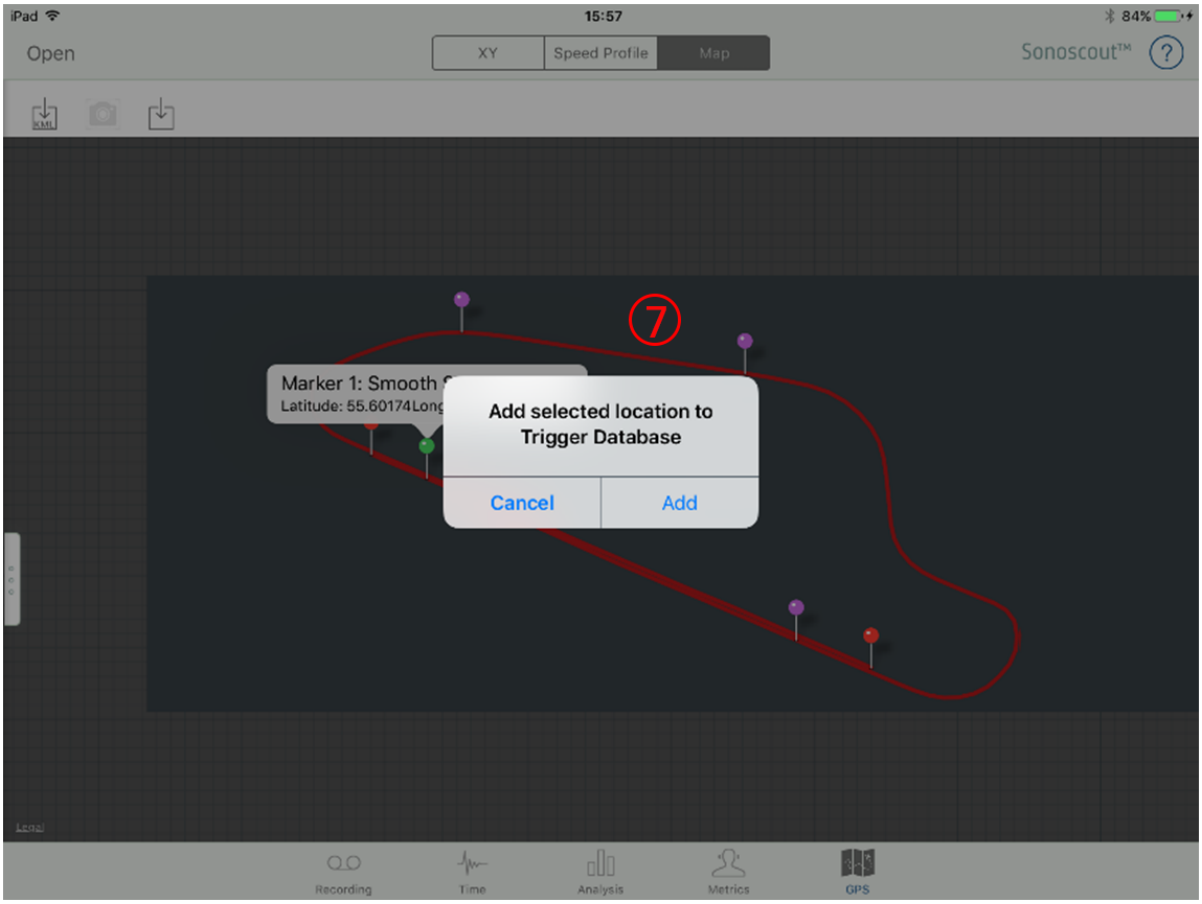
5. In the Time task, edit the marker names to uniquely identify the locations.



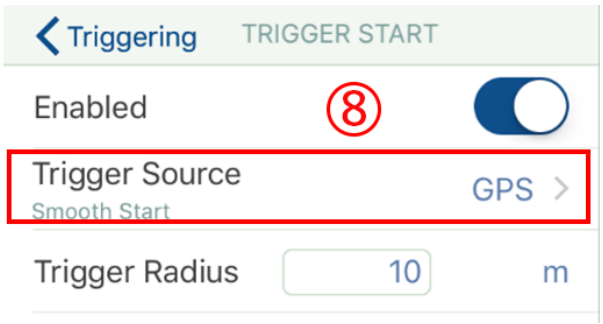
6. In the GPS task, display the map. Even if you are not connected to the internet it will display the map with the annotated markers on it.



7. Touch and hold each marker in turn to add those locations to the 'GPSTriggers' file.



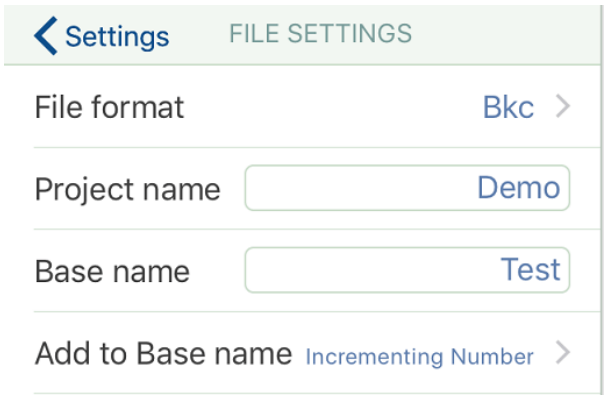
8. Using GPS Location as the Trigger Source, select the location from the list.



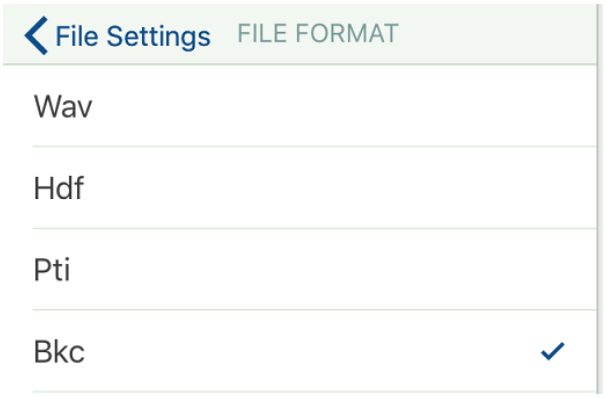
Setting up Folder and File Names

1. Tap *File Settings* to set up file type and folder/filenames:

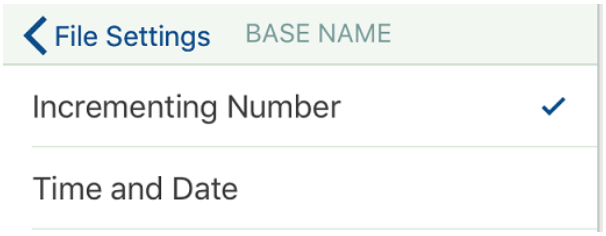
2. File and folder names: You can enter a *Project name* (i.e., the name of the folder where the file will be written) and a *Base* (file) *name*, which will be used for all recorded files:



3. Choose from one of four data formats for saving the recorded data:



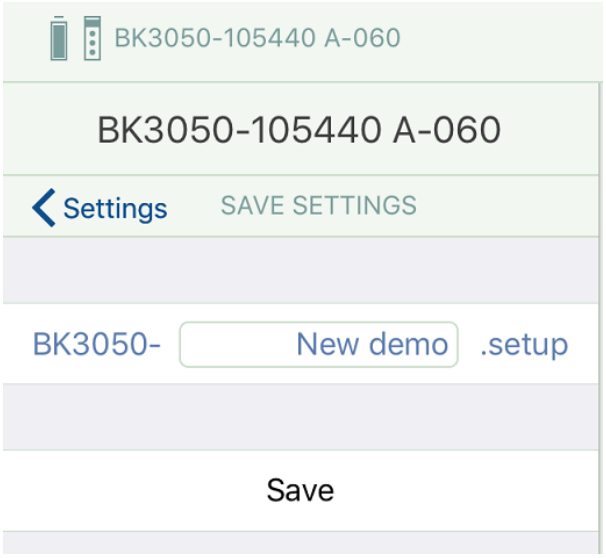
4. File extension: You can choose whether to append the *Time and Date* or an *Incrementing Number* to the Base filename. So in this example the first recorded file would be called *Test_001.bkc* and be located in the folder called *Demo*.



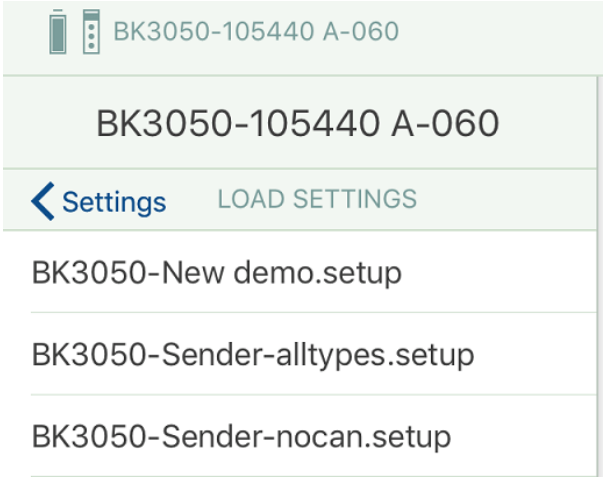
Saving and Loading Settings

1. All the recording setup information is stored on the mobile device in a default file, whose name is the type and serial number of the currently connected LAN-XI module, e.g.: *BK3050-105440 A-60*:

2. If you wish to create and keep a number of different setups you can tap the **Save** button (see above) and save the settings to a file. The name of the created file always starts with the module type number:



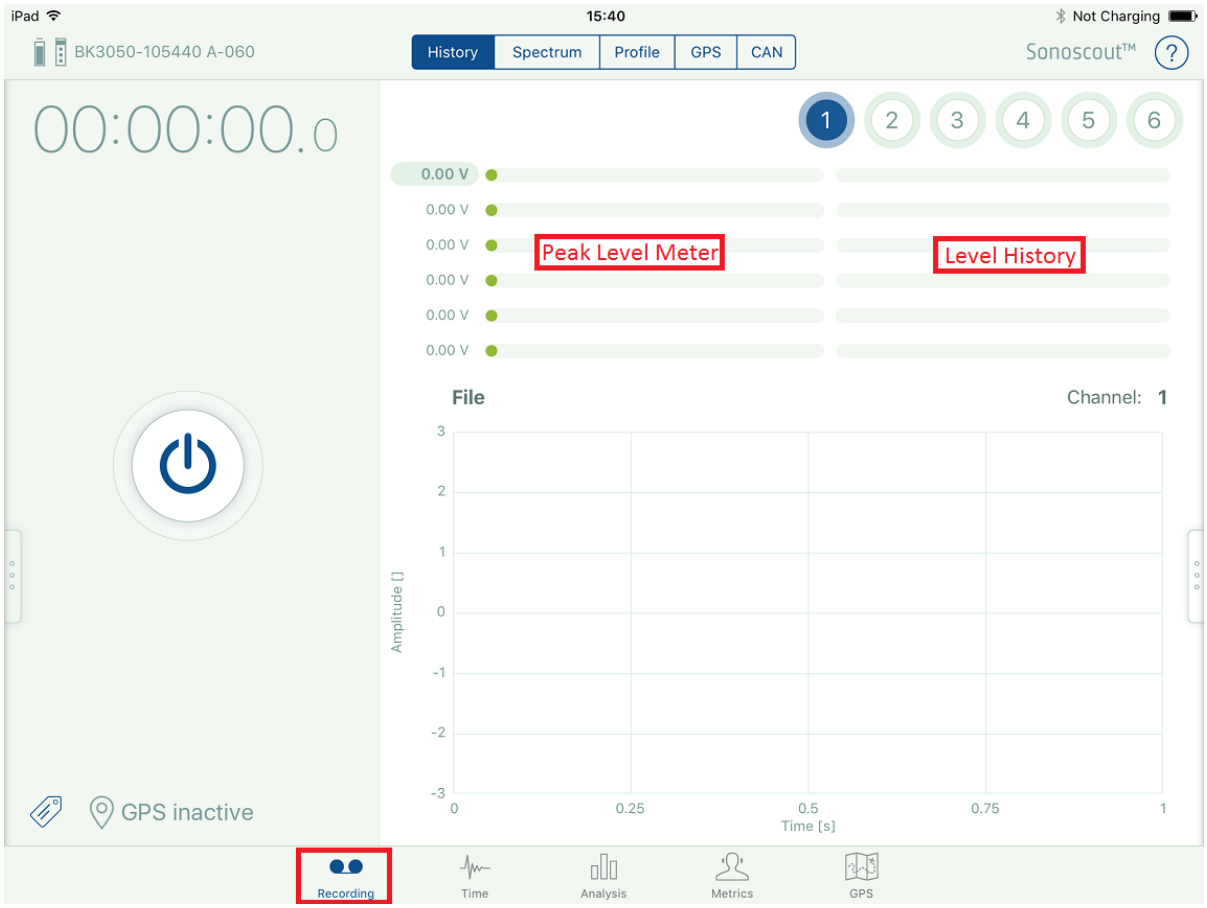
3. You can then use the **Load** button to load a saved file. (Only those that match the currently connected module will appear in the list):



- If you do this it will overwrite the previous default file and the new one will be used when you pre-record or record
- If you don't load a new setup, it will use the existing default file i.e., the settings you used the last time you pre-recorded or recorded
- If you connect the same iPad to a different type of front end you will see a different list of set ups

Making a Recording

1. Make sure the Recording task is selected and the front end is connected:



2. Tap to enter the Pre-recording mode:

Note 1: There may be a short delay whilst the front end is initialized.

Note 2: If you are Pre-recording (or Recording), some of the channel settings are disabled (for example, transducer specific, sampling frequencies, etc.) Display, file and threshold entries can be changed whilst pre-recording.

The system is now in the **Pre-recording** mode:

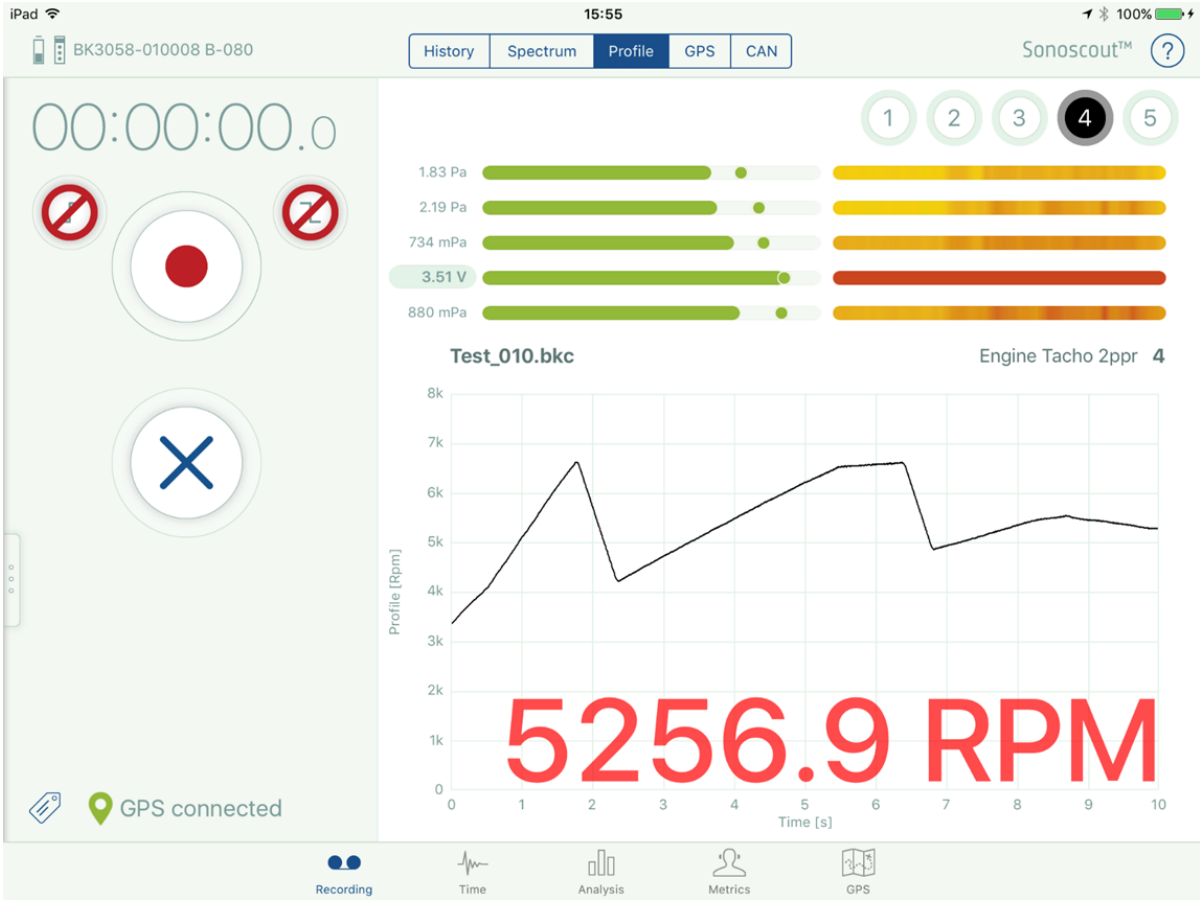
- The Record button appears, indicating the system is ready for recording
- The Time counter displays *00:00:00:0*
- Streaming of data from the front end has started and the Time display and level meters display the data
- The enabled channel connectors will be green on the LAN-XI module
- The associated peak level meters (centre) will display green bars (assuming signal levels are normal)
- The level history display starts to run

You can get a real-time display of the waveform on any channel by tapping **History** and choosing the Channel Number. If it is a tacho, it also displays the trigger threshold.

You can display the spectrum of any channel, or the profile for any channel that you have set up to be a 'Tacho' or 'CAN Voltage' channel type. You can also edit the meta-data whilst in pre-recording mode.

Tap to cancel Pre-recording.

If you select the **Profile** option for a tacho, or CAN Voltage channel, a large digital readout is superimposed on the real-time profile plot. The numbers are semi-transparent so that the curve can also be seen.

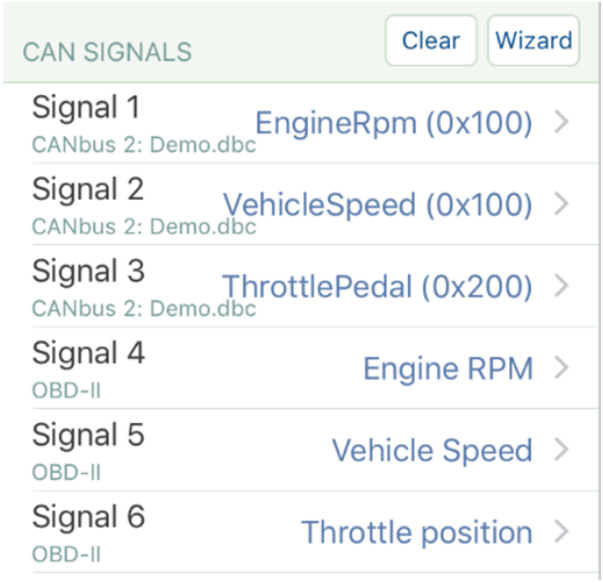


If you select the **GPS** option the real-time display shows a speed profile calculated from the GPS signal. A large digital readout is superimposed on the real-

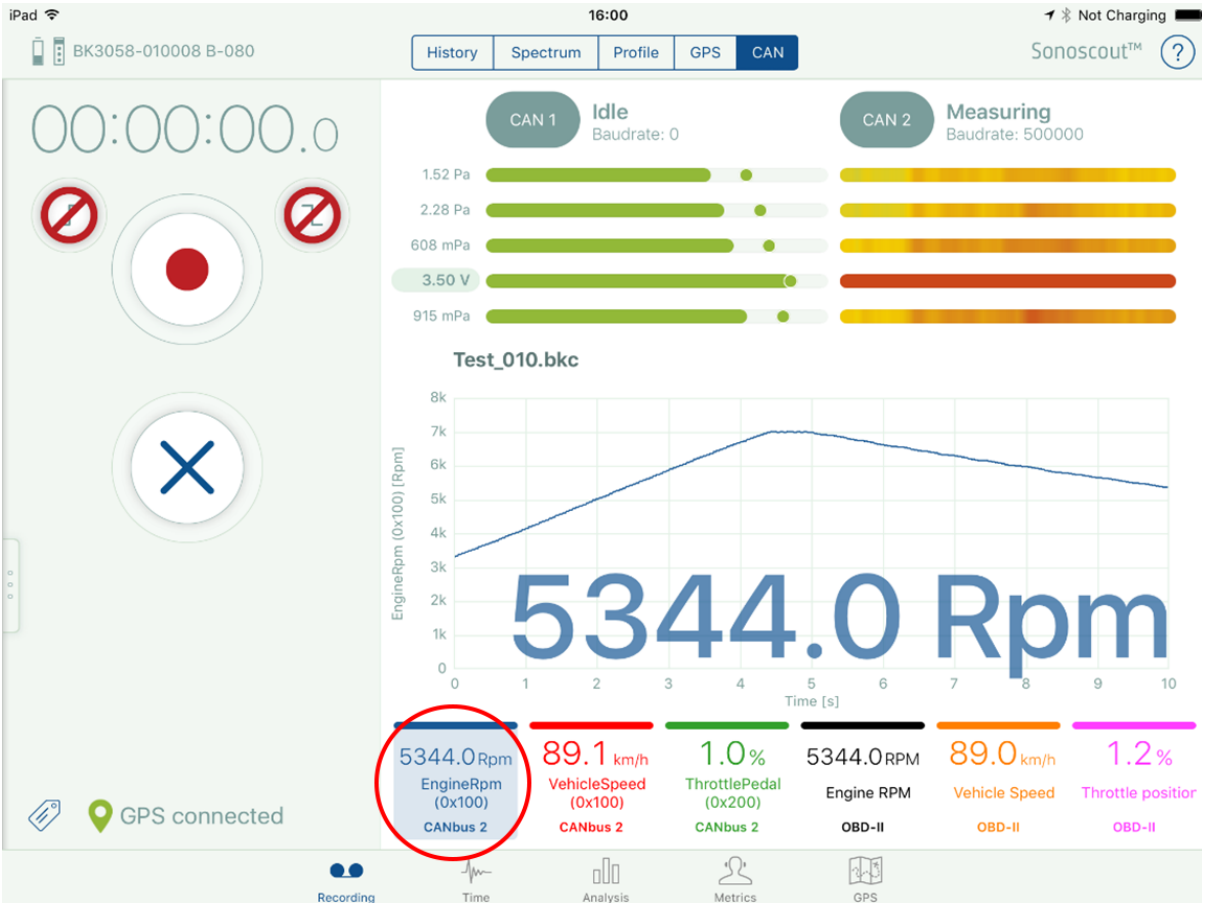
time profile plot. The update rate is approximately 1/second:

Note: This option only works for iPads that are cellular enabled.

If you select the **CAN** option, six CAN signals are available in real-time.



Touch the readout to display the corresponding profile.



3. Tap to start the recording:

The system is is now in the **Recording** mode:

- The Record button is flashing, the enabled channels are being recorded and the time counter is running.
- The Mark Event button appears. Use this button to add markers to the file to identify important events
- A GPS file is also recorded, update rate approximately 1 Hz

4. Tap to pause the recording (if required):

The system is now in the **Recording Paused** mode:

- The Pause button appears and is flashing
- The time counter stops at the elapsed time
- The front end continues streaming data (as displayed on the Time display and level meters), but nothing is being recorded
- Tap the flashing Pause button to continue with the recording, or tap the Stop (Recording) button to stop it
- A Marker is automatically added to the data file every time the recording is Paused. In the metadata form these markers are labelled 'Pause' to distinguish them from user-created markers

Note: If you continue with the recording, the data will be appended to the same file.

5. Tap to stop the recording:

The system reverts to the **Pre-recording** mode:

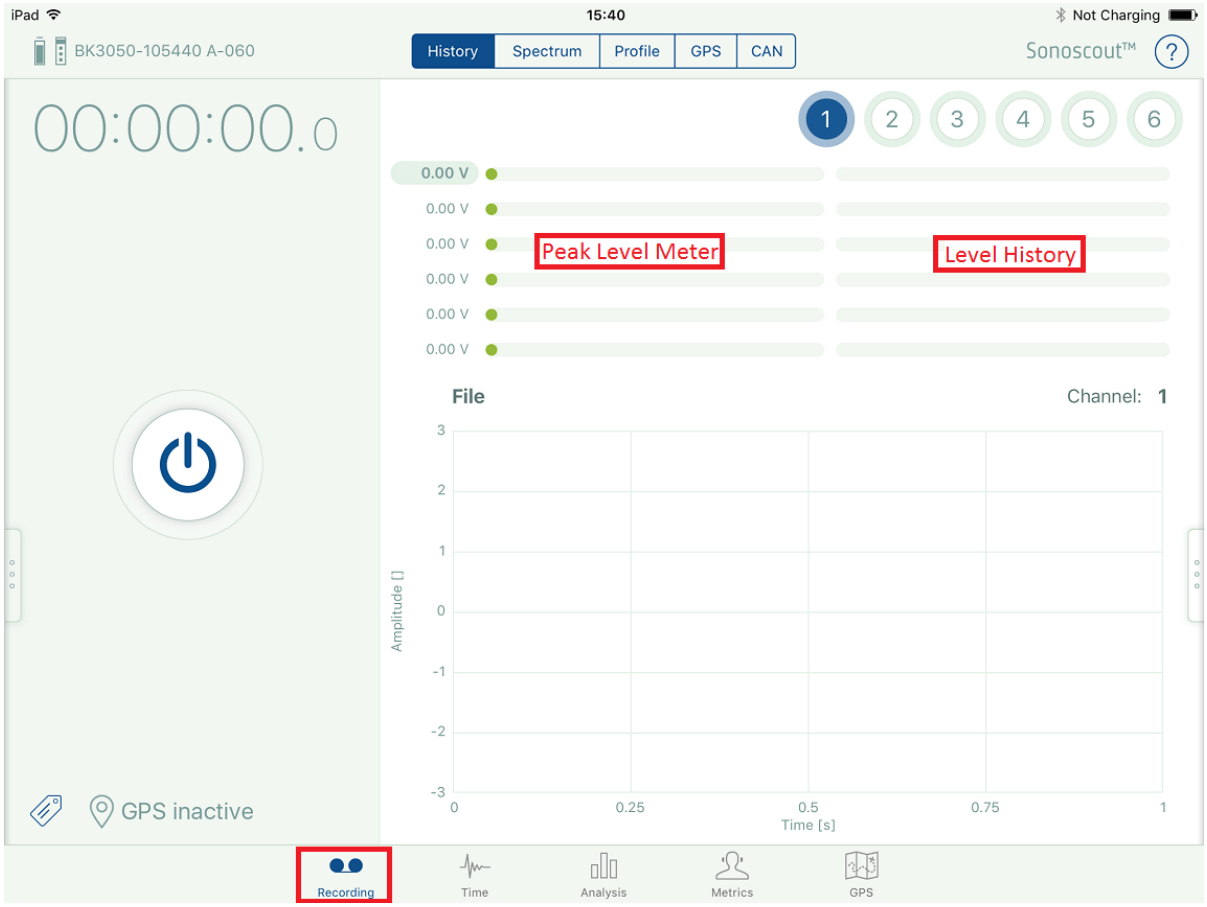
- The Record button has stopped flashing (indicating that recording is ready to start again)
- The time counter displays *00:00:00:0*
- Time display and level meters are displaying the data stream and recorder file is being stored

When in Pre-recording mode it is still possible to adjust many of the settings, in particular:

- Pre-trigger
- Auto-stop
- File settings
- Display settings

- Channel Default display and Max scaling value
- All tacho parameters

6. Tap the Stop data streaming button to stop streaming from the front end and return to the 'Standby' state:



The system is now back in the '**Standby**' mode:

- There is no streaming of data from the front end
- The 'Pre-recording' button is available
- The time counter is (greyed-out) and inactive
- To perform another recording, repeat steps 1 - 5

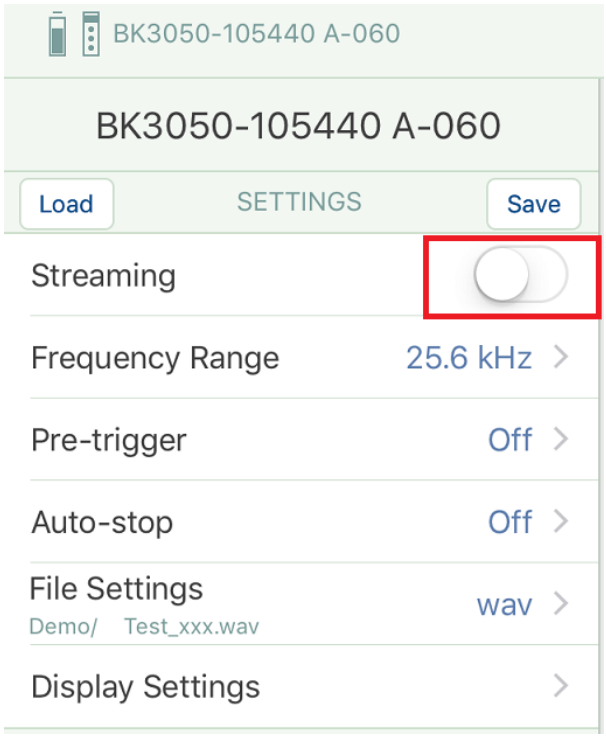
Note 1: The maximum file size you can record is 1.9 GB. The recording automatically stops once the limit is reached and a warning message appears.

Note 2: Recording automatically stops once there is less than 1.5 GB of free

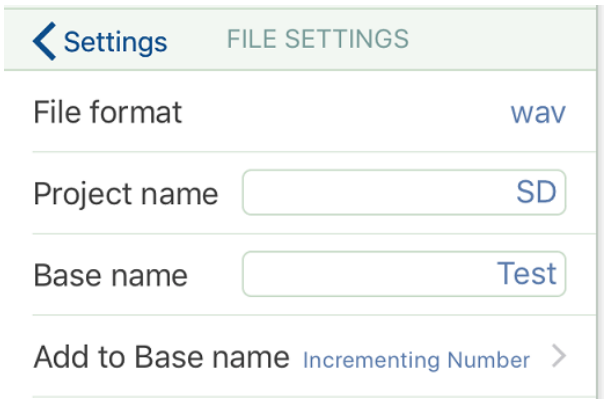
space on the mobile device.

Recording to the SD Card

1. Switch off *Streaming*:



2. Enter the *Project name* and *Base* (File) *name* as for a streamed recording:



3. During the recording the Peak meters and real-time GPS are functional, but the real-time channel displays (Time History, Spectrum and Profile) will be empty, as this information is not available.

iPad
16:38
86%
BK3050-105440 A-060
History
Spectrum
Profile
GPS
CAN
Sonoscout™
00:00:28.5
Recording to SD Card
734 mPa
1.24 Pa
3.47 V
1.05 %
2377 RPM
39.5 Km/h
SD- Test_001
Speed [km/h]
Time [s]
0
GPS connected
Recording
Time
Analysis
Metrics
GPS

Reviewing Time Data

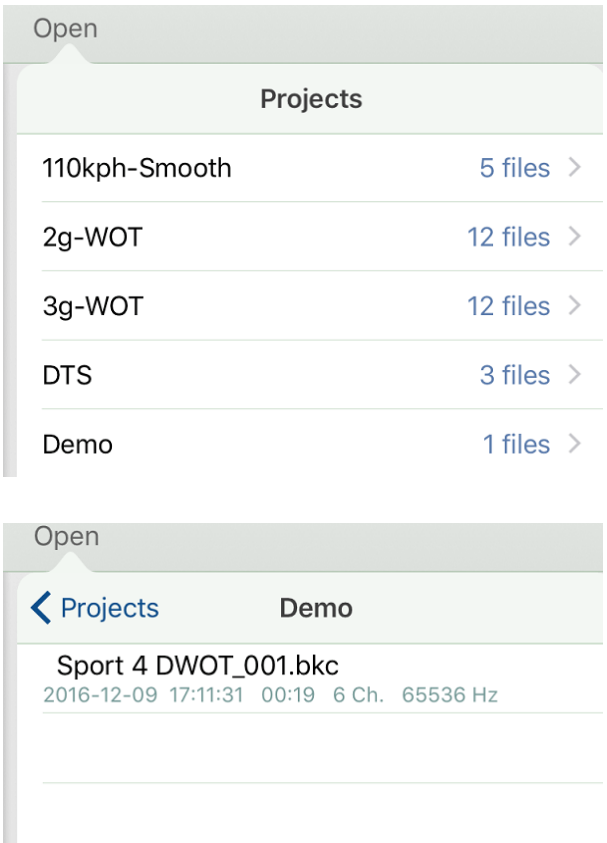
Time

Overview

The Time task allows you to visually check all the channels in a time history, display the tacho and CAN profiles and listen to any channel (or pairs of channels) as stereo sound.

Loading a File

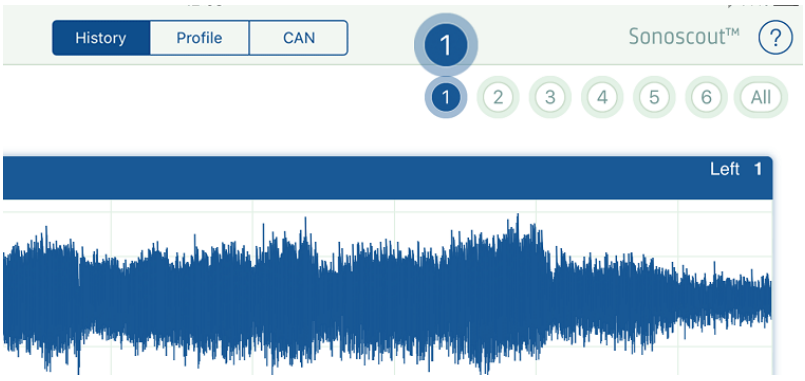
1. Tap Open to select the project folder and file you want to display:



2. Tap the file name to open the file:

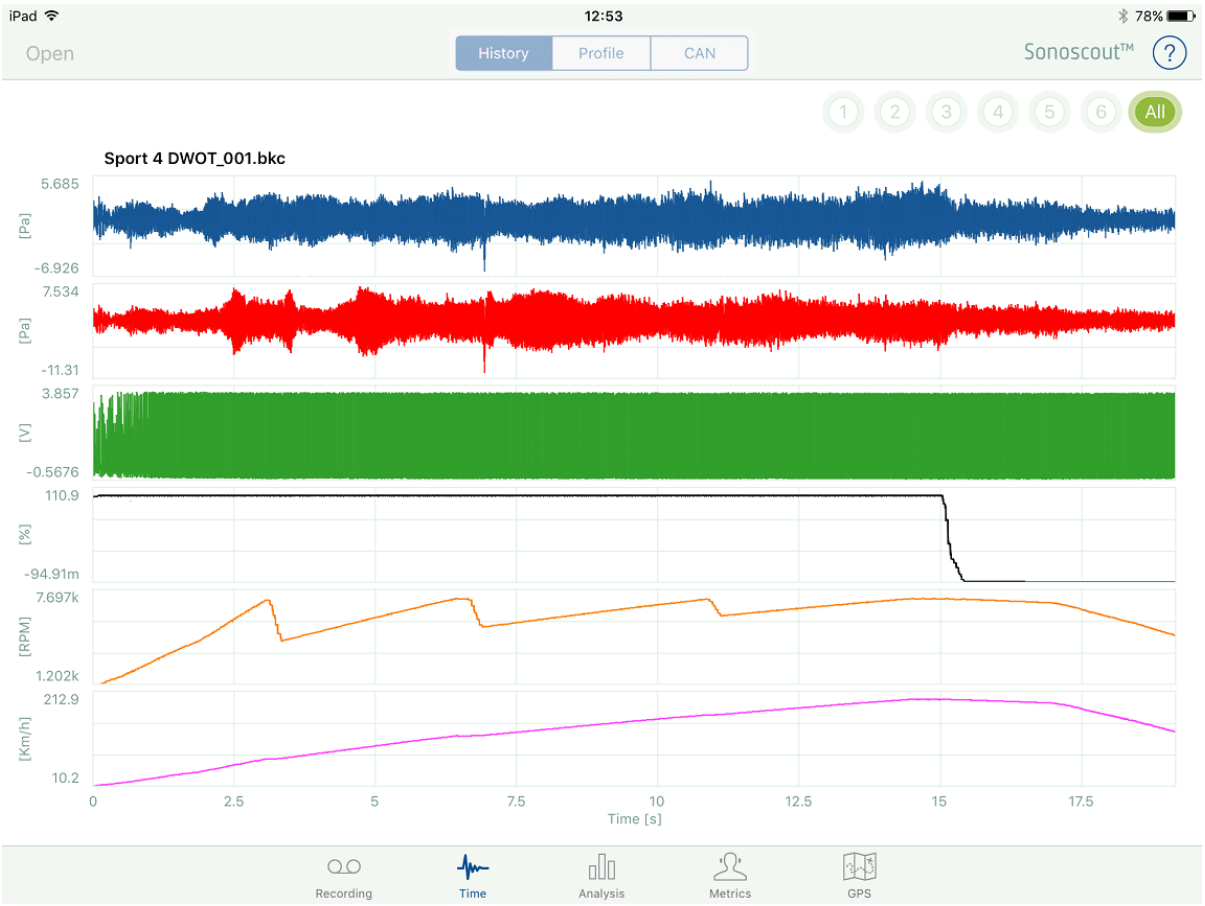
Changing Channels

Slide your finger along the channel buttons (see below). You will see a large number displayed above the button which indicates which channel will be selected if you remove your finger.



Displaying All Channels

1. Tap the **All** button to toggle between displaying all channels and displaying two channels:



The purpose of this display is to perform a quick visual check that there are no obvious problems with a channel (for example, intermittent behaviour or dropouts, etc).

Displaying Profiles

1. Tap the **Profile** button, both displays switch to profiles:

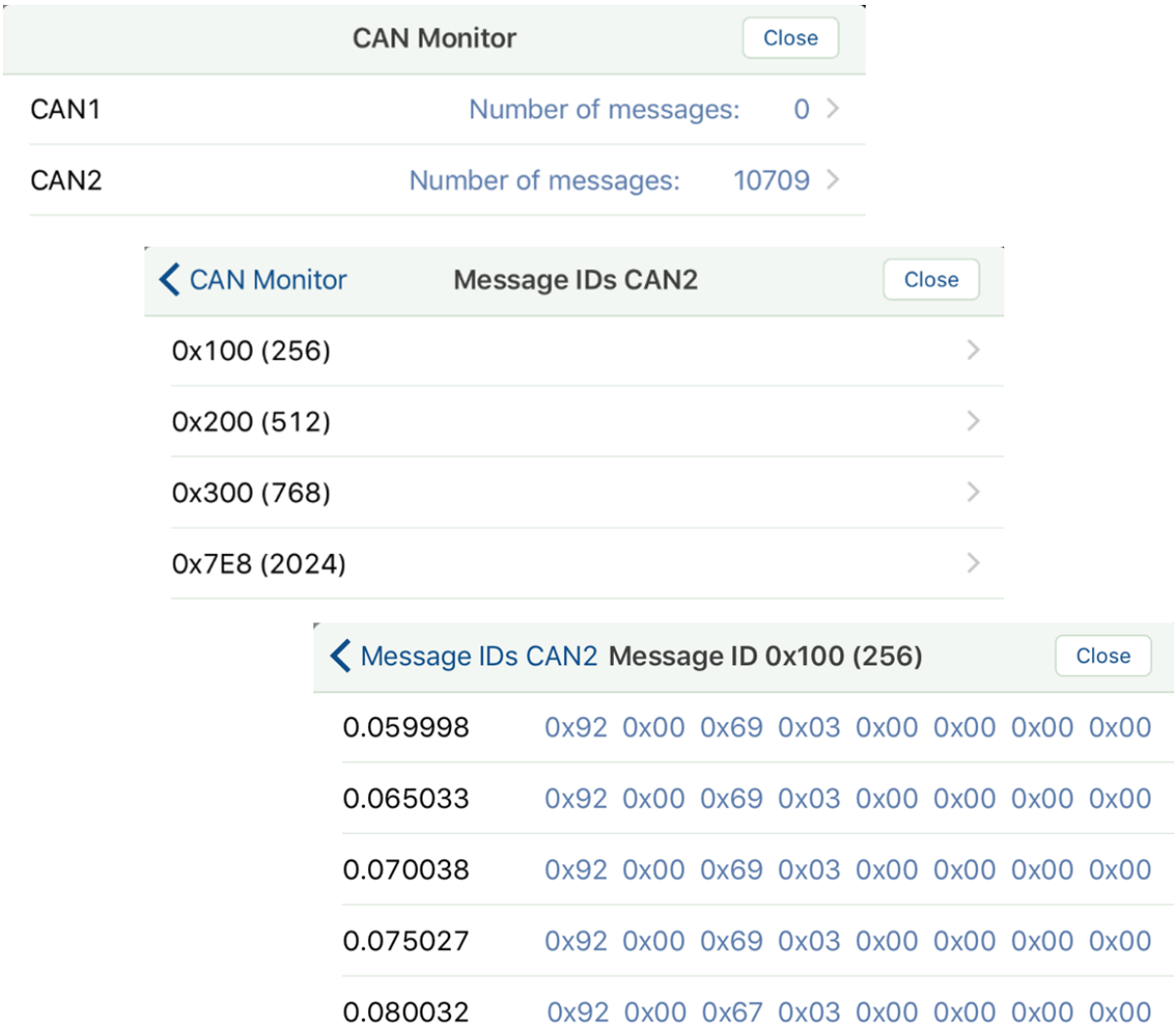
A profile channel can either be a Tacho pulse or a CAN Voltage and any channels containing tacho signals are converted to profiles using the settings in the metadata

The channel selection buttons for all non-profile channels are greyed out.

Displaying CAN Bus Data

Use the CAN option to display CAN signals as profiles. You can display any of the six pre-selected CAN signals in either window.

Tap to view the Message IDs.



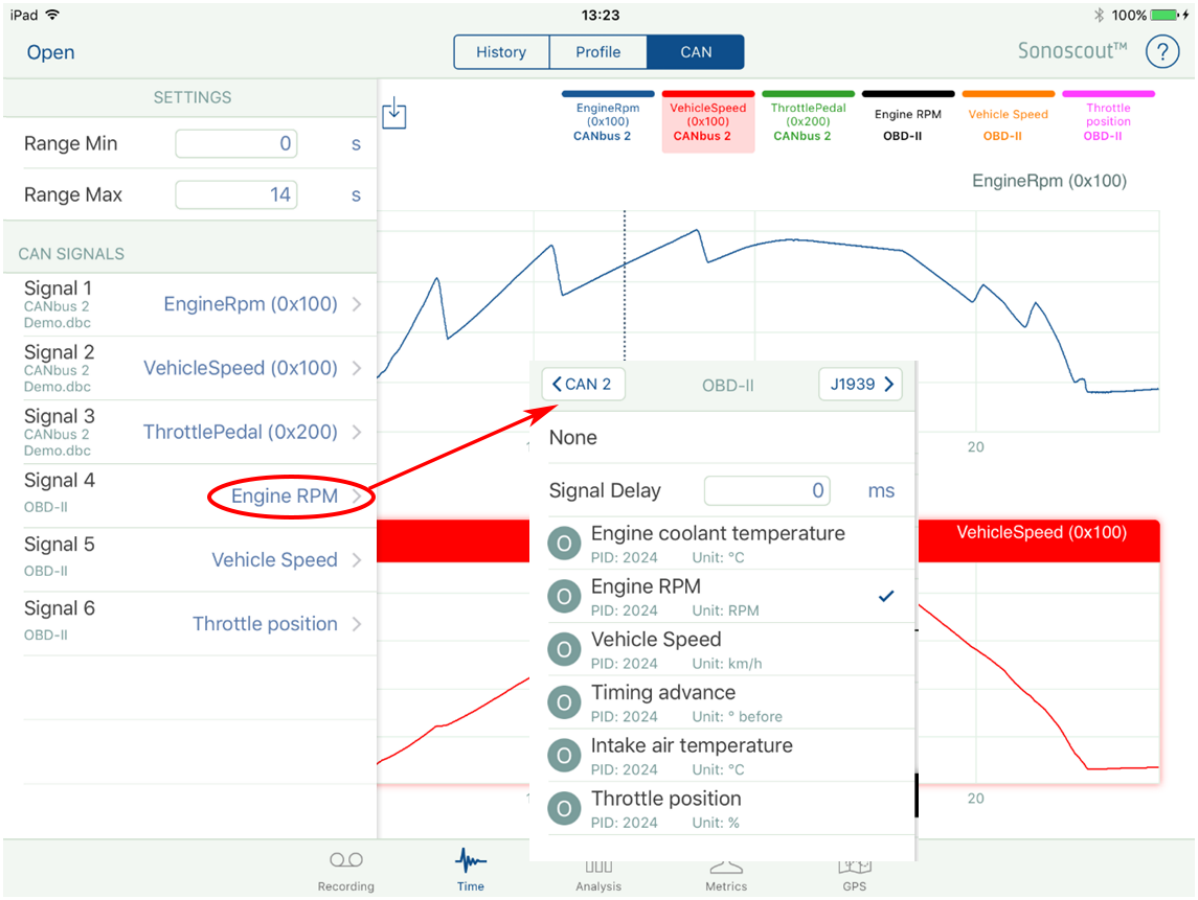
Even if you are not a CAN expert, this information is useful to:

- Check that CAN data was recorded
- Confirm that the messages of interest are included
- Identify the time stamp interval which may be different for each message

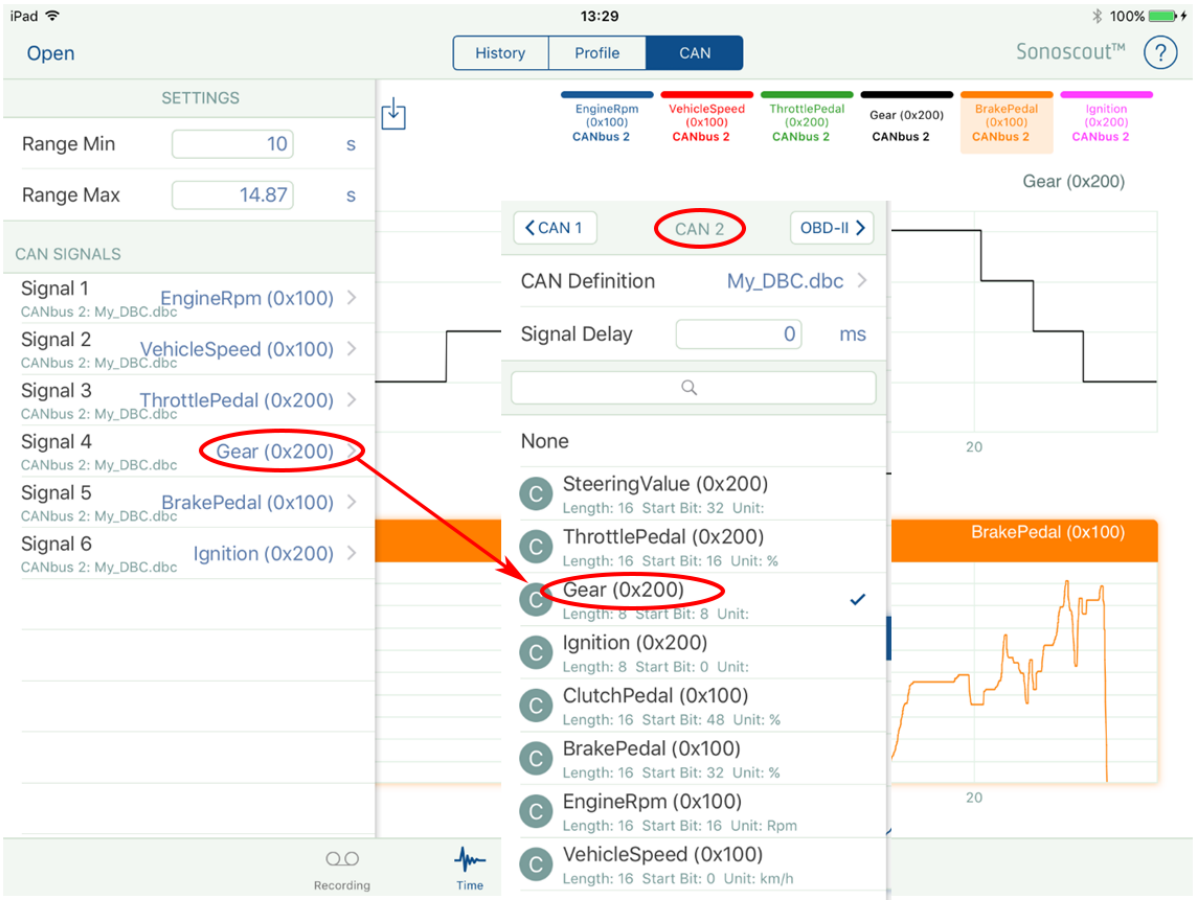
Viewing Different CAN Bus Data

Because the raw CAN data is always stored, you can select different CAN signals from the .dbc file to display, see the example below.

1. Select the CAN signal you want to change from the list in the Settings panel, Signal 4 in the example, the CAN Type panel pops up.

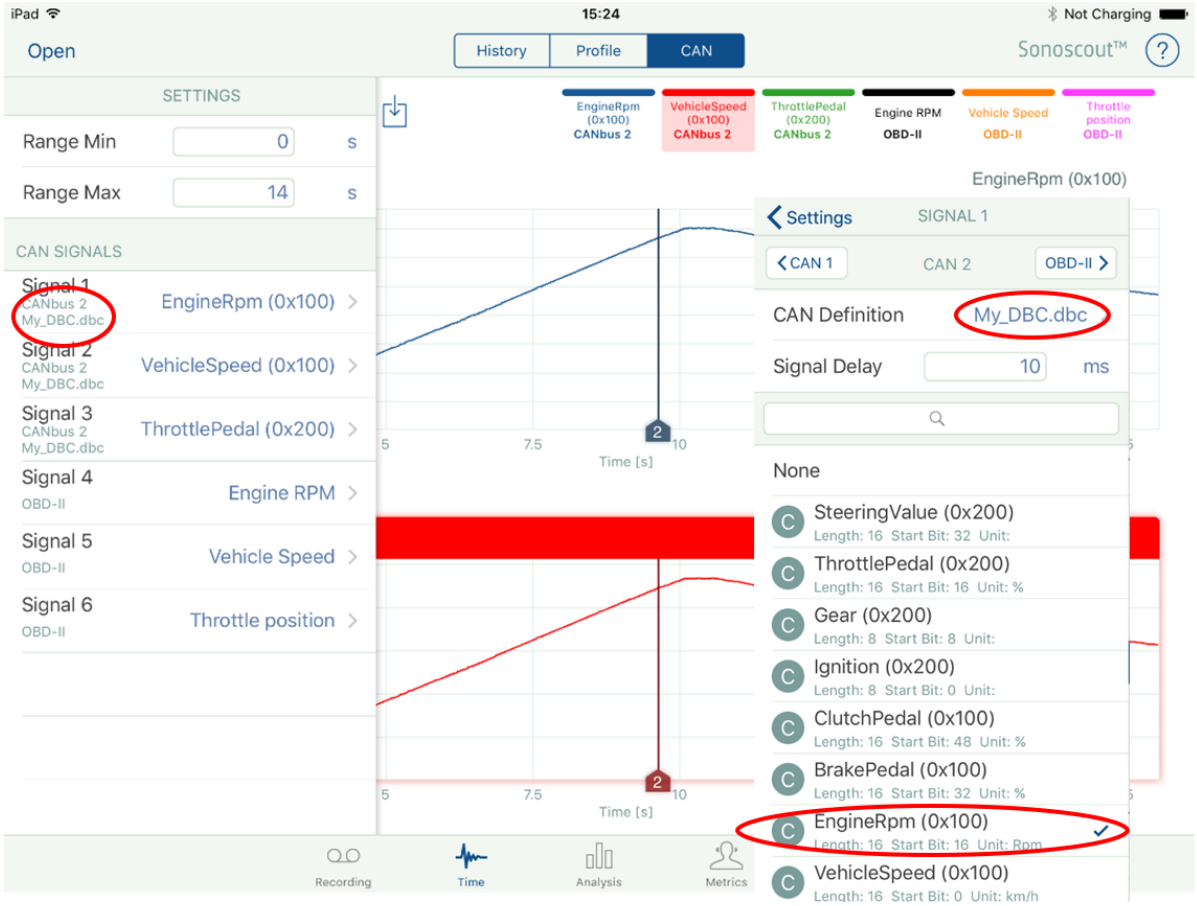


In the CAN Type panel change the selection from *OBD-II* to *CAN 2*, and then select a different signal to view, *Gear* in the example. You can also select other signals to view from the same list.



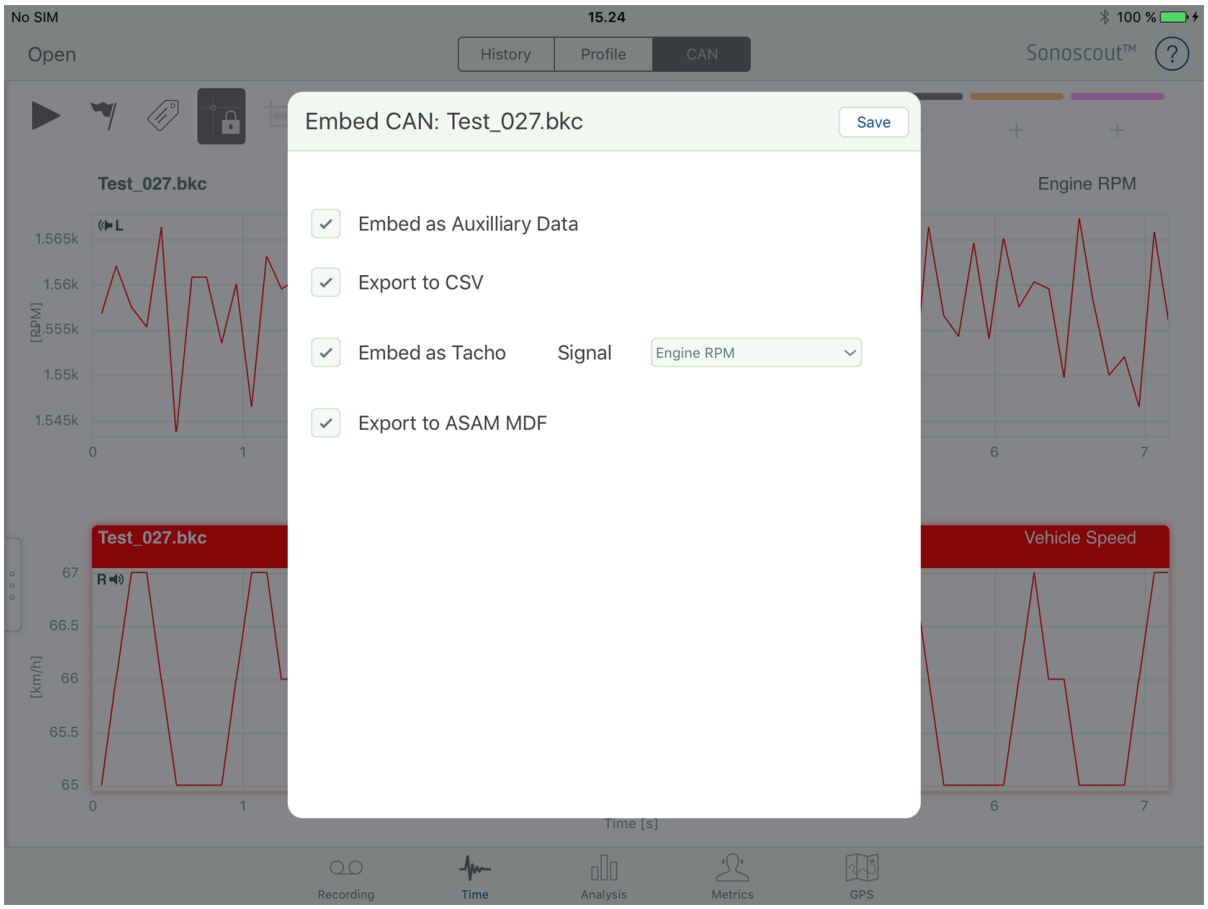
You can also replace the original .dbc file with a different one. Obviously, the new file needs to be compatible with the recorded raw CAN data. There are several reasons why you may want to do this.

For example, you may not have had a valid .dbc file when you made the recording but it has since become available and so you can use it for processing the data. Another example might be that you only had a CANdidate .dbc file (containing only EngineSpeed, VehicleSpeed and GasPedal) when you made the recording but now you have a full .dbc file and you would like to display or embed different CAN signals.



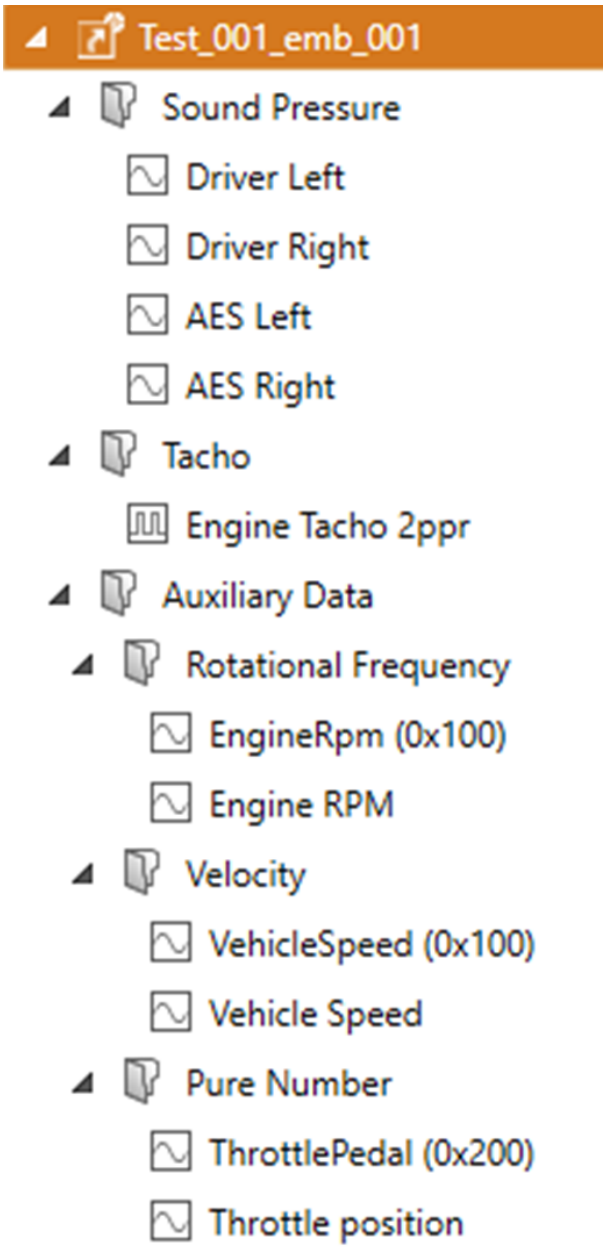
Embedding CAN Bus Data

Tap the icon (see above) to embed the CAN signals.



There are four options:

1. *Embed as Auxiliary Data* - appends the six CAN signals to the time history file as Auxilliary Data channels.



Note: This option is only available if the time history file is in .bkc format.

2. *Export to CSV* - exports the six CAN Signals as individual .csv files.

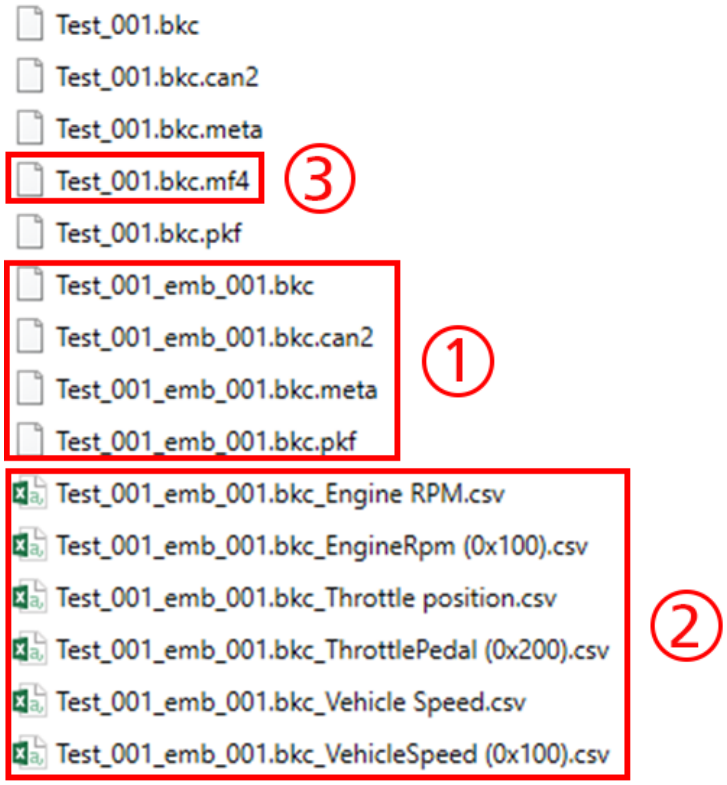
Test_001_emb_001.bkc	
Source: EngineRpm (0x100)	
Type: CANbus 2	
Time [s]	EngineRpm (0x100) [Rpm]
0.118225	875
0.124207	875
0.129242	875
0.134262	875
0.139236	875
0.144211	875
0.149353	875
0.154358	875
0.160126	875

3. *Embed as Tacho* - adds the selected CAN signal as a Tacho channel to the original time history file. The new file can be used in PULSE™ Reflex or Sonoscout.

4. *Export to ASAM MDF* - converts the complete raw CAN file(s) to an .mf4 file in ASAM MDF format.

Additional Files Created by Embedding CAN

If you use the 'Embed CAN' option in the Time task the following files are generated:



1. *Test_001.emb_001.bkc* - includes the CAN signal profiles as auxiliary channels and/or tachos.

2. *Test_001.emb_001.bkc_CANSignalName.csv* - a separate .csv file is written for each CAN signal used in the recording.

   Note: for non-BKC files the .csv files are created with the original base name, not base-name_emb_001.

3. *Test_001.bkc.mf4* – there is an option to export the raw CAN data in ASAM MDF format with the same basename as the original file.

Playing a File (or Selecting Part of a File to Play)

1. Tap the Play/Stop button to control the replay.

The Play Cursor shows which point in time you are currently hearing and it is synchronised in both windows. If no range has been selected it plays the whole sound and loops when it gets to the end of the file.

You can start playing from any point by tapping in either display to place the cursor there.

If the **Cursor Synchronisation** button is off (unlocked), you can place the cursor (or drag a range) independently in each display.

The cursor position in the active (highlighted) window will determine where sound replay starts. If is on (locked), the cursor and range selection is synchronised in both displays.

2. Select a range to play by touching the start point and then touching and holding your finger down on the end point in the top display:

You can extend the range in either direction by touching then holding your finger at the new start/ end point. You can also enter the start and end times for the range in the settings menu.

3. With a range selected, tap ▶ to play the range, looped with cross-fading at the ends.

Trimming

1. Use the **Trim** button to trim the file to the selected range.

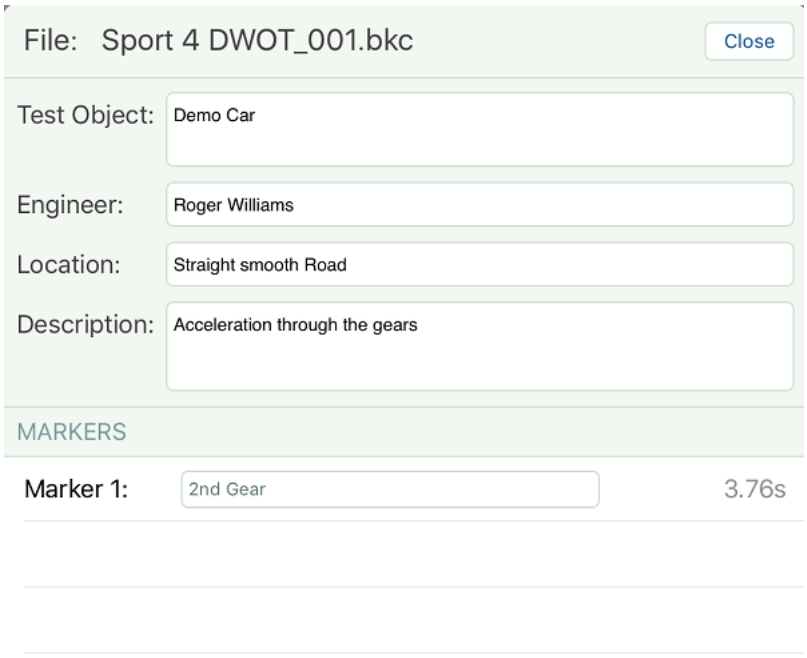
   A new file is saved to the folder containing the source file. It has the same file name as the original file with the trim range appended to it. A pop-up allows you to choose whether you want to open the trimmed file, or not:

Markers

If you tap the **Marker** button during a recording, you add numbered markers to the recorded file:

These are shown on all time history displays on the Time, Analysis, Metrics and GPS tabs.

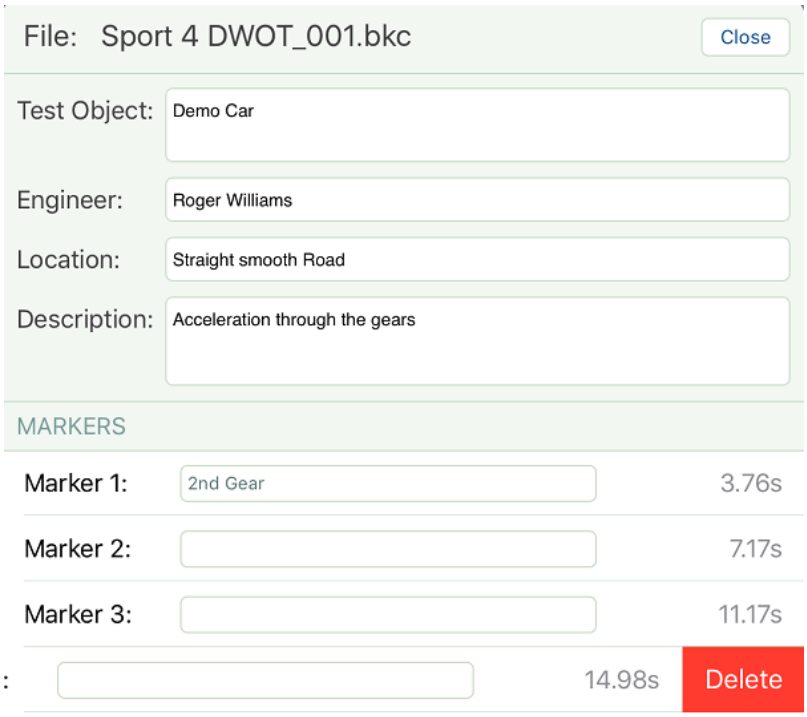
They are also added to the metadata, and after the recording has stopped, you can open the metadata and enter a description for each marker:



If you tap the **Marker** button in the Time task, it will add a new marker at the current play cursor position. It will renumber any existing markers to ensure they remain sequential:

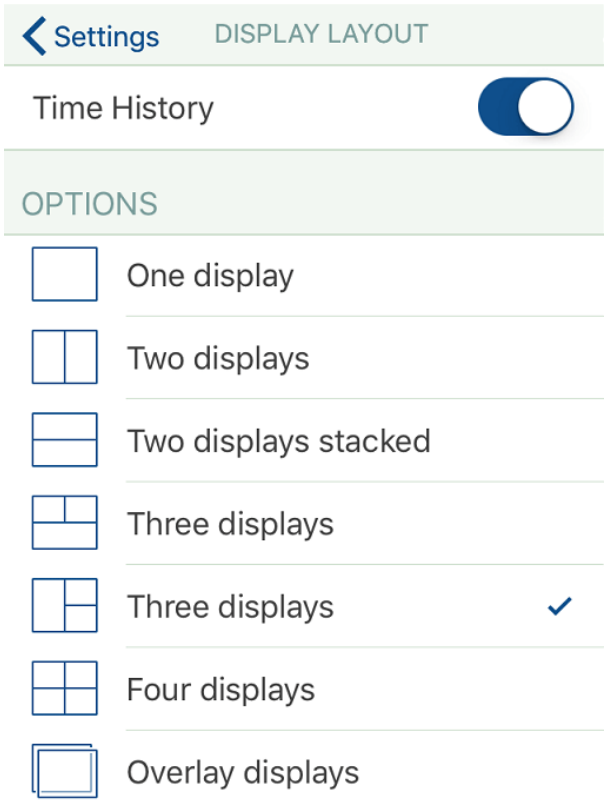
They will be added to the Metadata list.

Individual markers can be deleted in the usual way (tap on the marker, swipe to the left, you can then delete the marker):

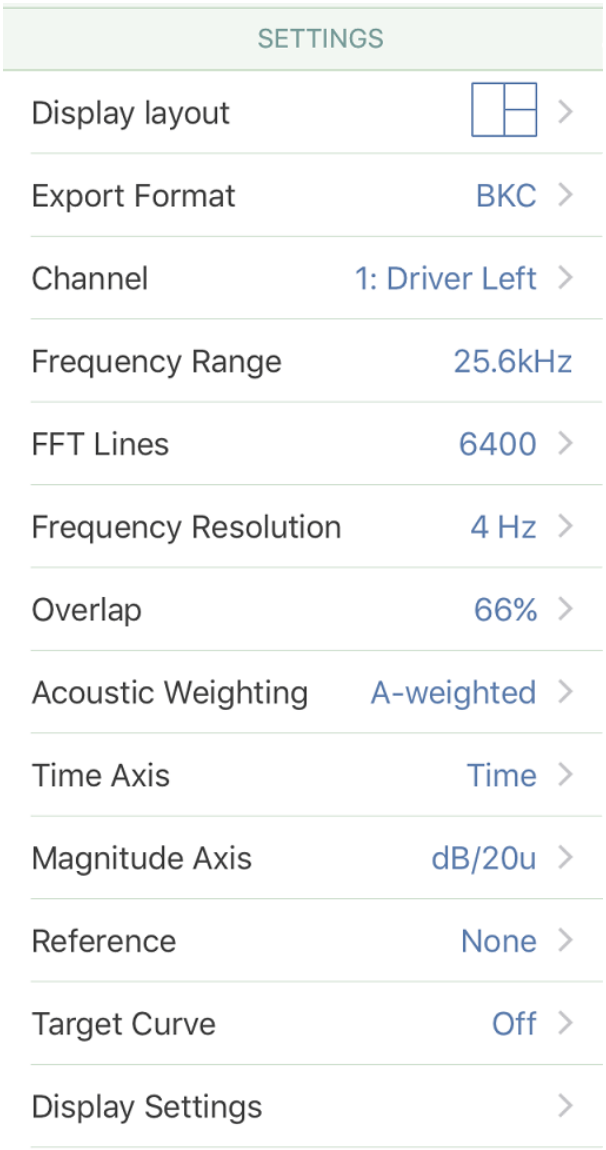

File: Sport 4 DWOT_001.bkc
Close
Test Object:
Demo Car
Engineer:
Roger Williams
Location:
Straight smooth Road
Description:
Acceleration through the gears
MARKERS
Marker 1:
2nd Gear
3.76s
Marker 2:
7.17s
Marker 3:
11.17s
14.98s
Delete

How the Displays Work

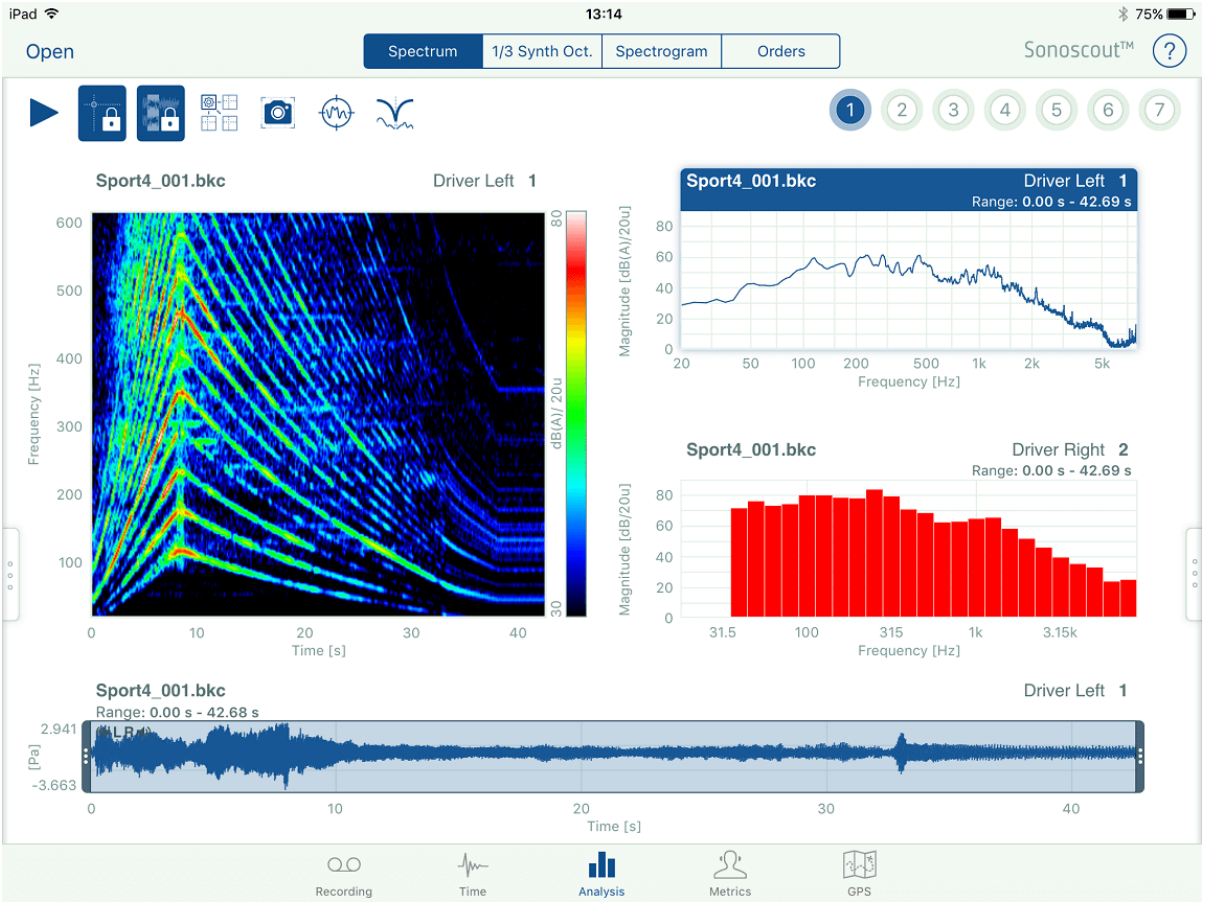
1. Open the file.
2. Select *Display layout* on the settings panel and choose your layout:



3. Select the Time History, if required:



4. Touch a display to make it active. The title bar is highlighted in grey to make it obvious that it is the active display:



5. Choose the type of spectrum to be displayed in the active display (see above).

6. Open the file to display.

7. Choose the channel to be displayed in the active display.

   The time history of the selected file and channel number will be displayed. The range is set to the complete time history as indicated by the black background. The average over the entire range is displayed for *Spectrum* and *1/3rd Octave*. The spectrogram and orders are displayed for the entire range. If you tap ▶ you will hear the file/channel displayed in the time history.

8. Repeat this process for all the other displays.

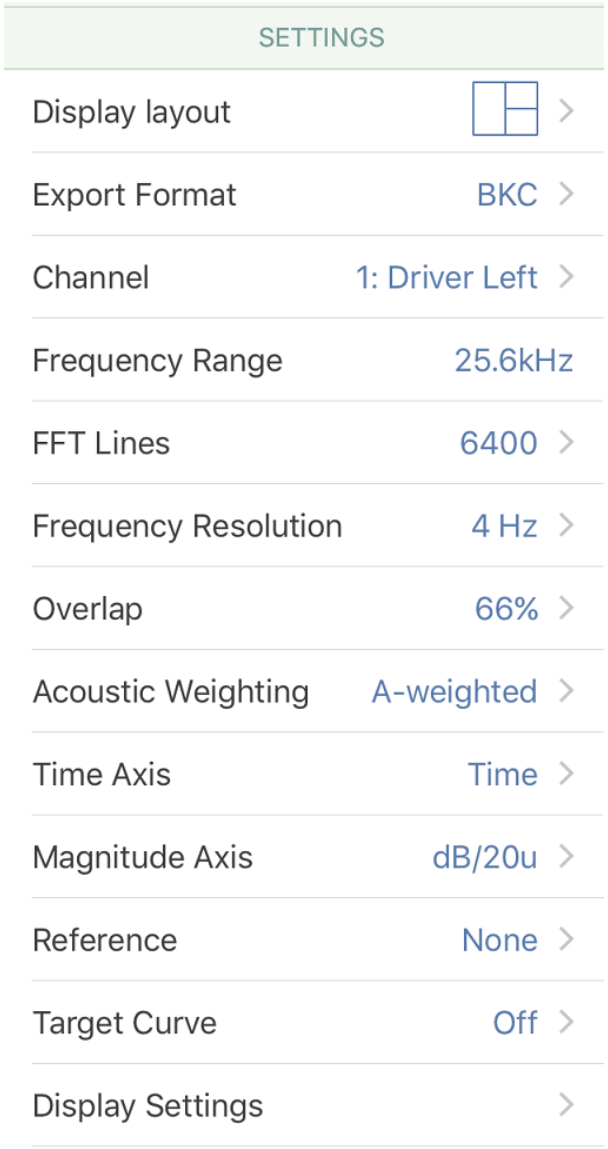
Note: The active display is the 'master' which controls what you see and hear.

Calculation and Display Settings

Each display has its own display and calculation settings.

To change the calculation parameters:

1. Touch a display to make it active
2. Open the Settings menu and make the changes:

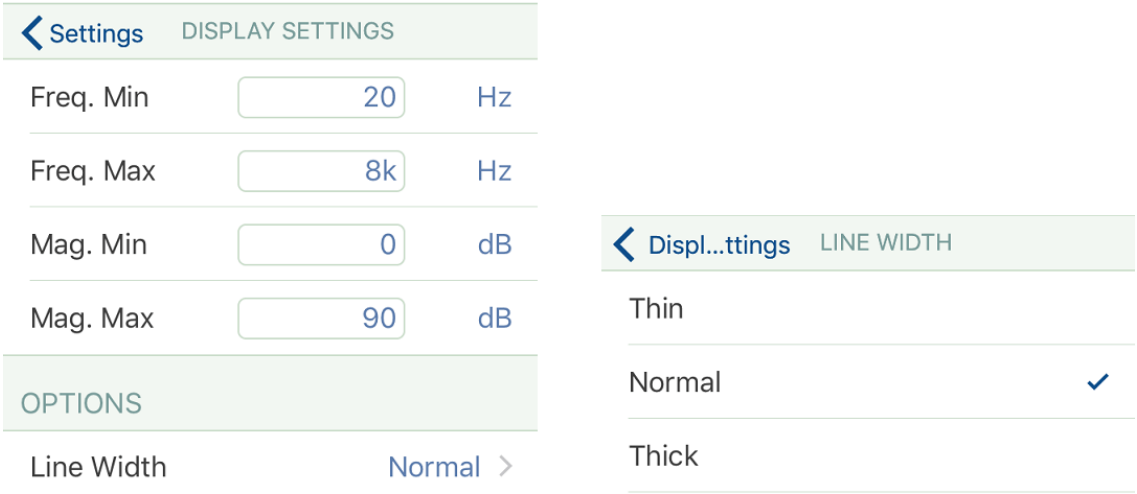


Note: Each display has its own settings, those above are for *Spectrum*.

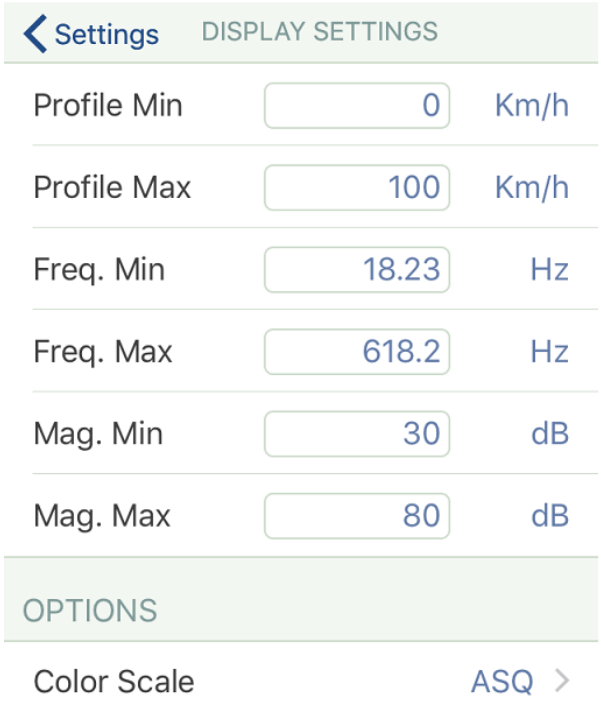
To change the display settings:

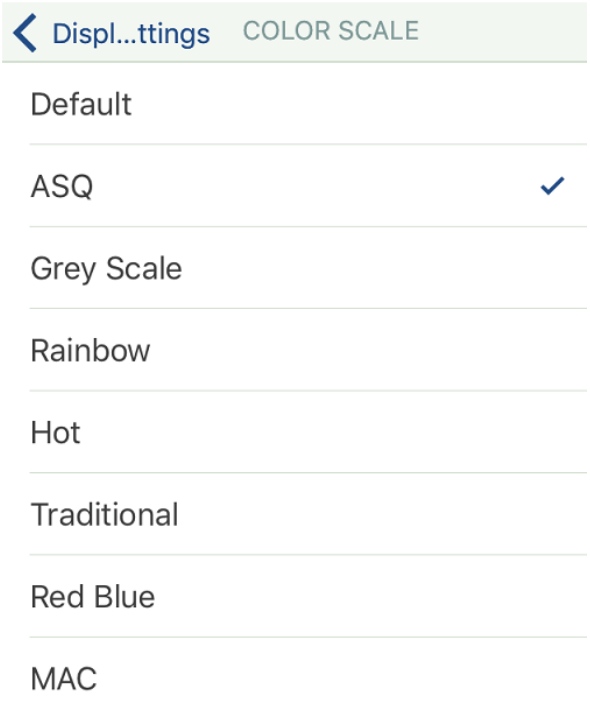
1. Touch a display to make it active

2. Open the Settings menu, tap on *Display Settings* and enter the default values in the Display Settings form. This includes choosing the line thickness from the list:

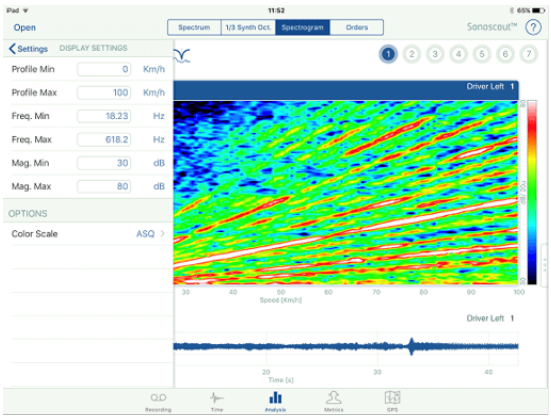


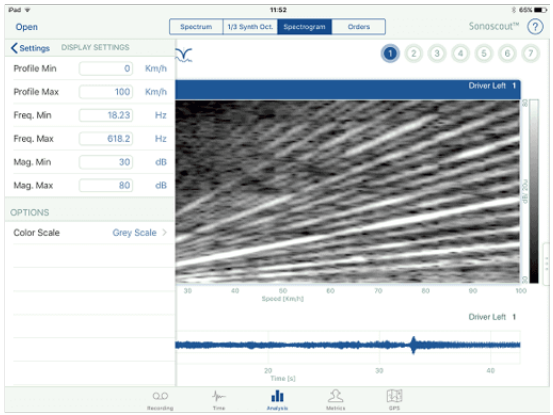
3. For Spectrogram displays there are eight colour scales to choose from:

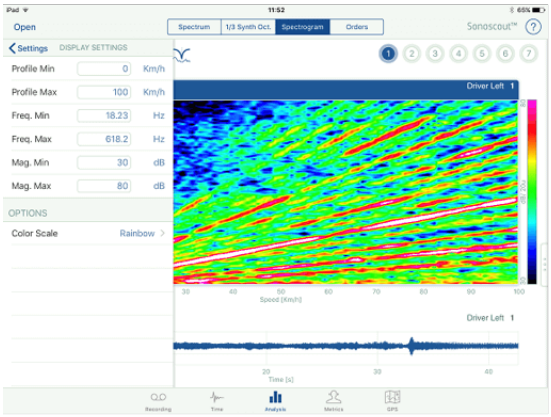


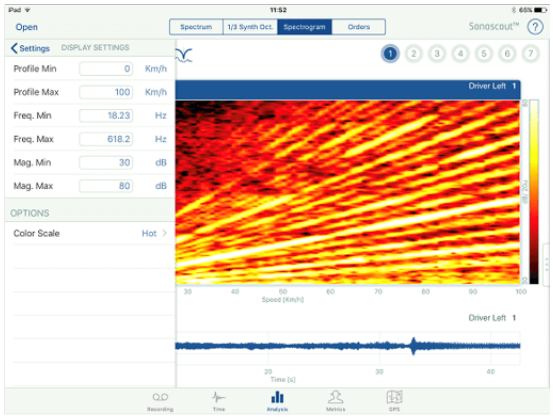


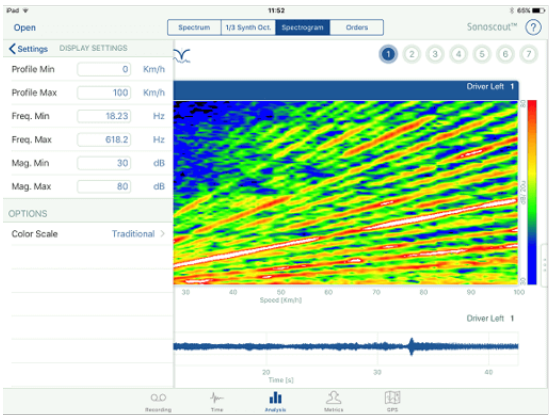
This is what they look like:

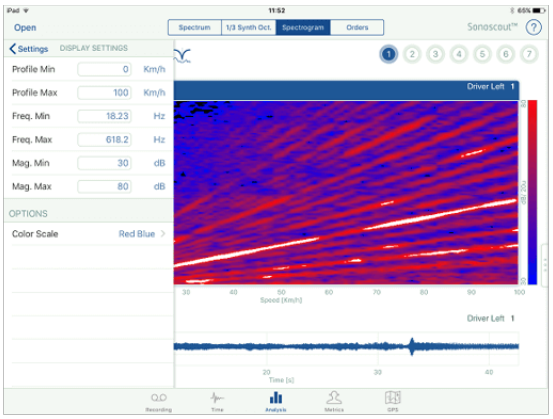

Open
Spectrum
1/3 Synth Oct.
Spectrogram
Orders
Sonoscout™
Settings
DISPLAY SETTINGS
Profile Min 0 Km/h
Profile Max 100 Km/h
Freq. Min 18.23 Hz
Freq. Max 618.2 Hz
Mag. Min 30 dB
Mag. Max 80 dB
OPTIONS
Color Scale ASQ
Driver Left 1
Speed [Km/h]
Time [s]

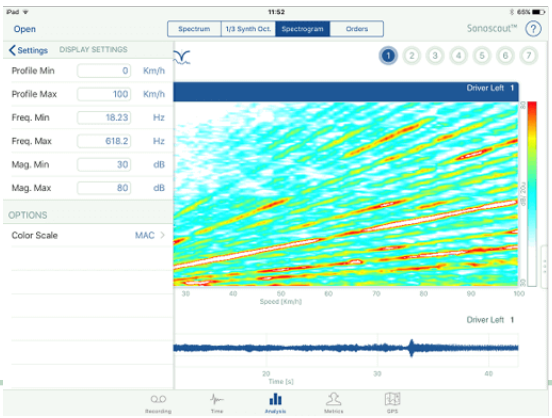

Open
Spectrum
1/3 Synth Oct.
Spectrogram
Orders
Sonoscout™
Settings
DISPLAY SETTINGS
Profile Min 0 Km/h
Profile Max 100 Km/h
Freq. Min 18.23 Hz
Freq. Max 618.2 Hz
Mag. Min 30 dB
Mag. Max 80 dB
OPTIONS
Color Scale Grey Scale
Driver Left 1
Speed [Km/h]
Time [s]

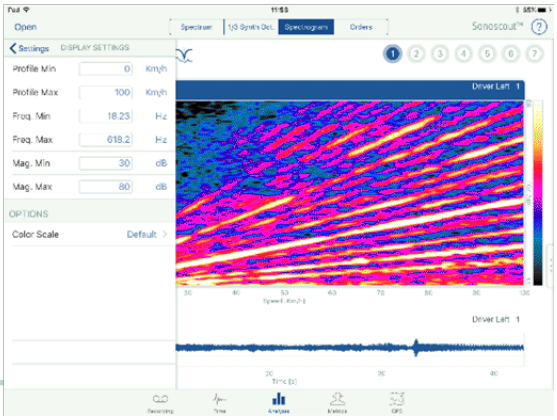

Open
Spectrum
1/3 Synth Oct.
Spectrogram
Orders
Sonoscout™
Settings
DISPLAY SETTINGS
Profile Min 0 Km/h
Profile Max 100 Km/h
Freq. Min 18.23 Hz
Freq. Max 618.2 Hz
Mag. Min 30 dB
Mag. Max 80 dB
OPTIONS
Color Scale Rainbow
Driver Left 1
Speed [Km/h]
Time [s]


Open
Spectrum
1/3 Synth Oct.
Spectrogram
Orders
Sonoscout™
Settings
DISPLAY SETTINGS
Profile Min 0 Km/h
Profile Max 100 Km/h
Freq. Min 18.23 Hz
Freq. Max 618.2 Hz
Mag. Min 30 dB
Mag. Max 80 dB
OPTIONS
Color Scale Hot
Driver Left 1
Speed [Km/h]
Time [s]


Open
Spectrum
1/3 Synth Oct.
Spectrogram
Orders
Sonoscout™
Settings
DISPLAY SETTINGS
Profile Min 0 Km/h
Profile Max 100 Km/h
Freq. Min 18.23 Hz
Freq. Max 618.2 Hz
Mag. Min 30 dB
Mag. Max 80 dB
OPTIONS
Color Scale Traditional
Driver Left 1
Speed [Km/h]
Time [s]


Open
Spectrum
1/3 Synth Oct.
Spectrogram
Orders
Sonoscout™
Settings
DISPLAY SETTINGS
Profile Min 0 Km/h
Profile Max 100 Km/h
Freq. Min 18.23 Hz
Freq. Max 618.2 Hz
Mag. Min 30 dB
Mag. Max 80 dB
OPTIONS
Color Scale Red Blue
Driver Left 1
Speed [Km/h]
Time [s]


Open
Spectrum
1/3 Synth Oct.
Spectrogram
Orders
Sonoscout™
Settings
DISPLAY SETTINGS
Profile Min 0 Km/h
Profile Max 100 Km/h
Freq. Min 18.23 Hz
Freq. Max 618.2 Hz
Mag. Min 30 dB
Mag. Max 80 dB
OPTIONS
Color Scale MAC
Driver Left 1
Speed [Km/h]
Time [s]


Open
Spectrum
1/3 Synth Oct.
Spectrogram
Orders
Sonoscout™
Settings
DISPLAY SETTINGS
Profile Min 0 Km/h
Profile Max 100 Km/h
Freq. Min 18.23 Hz
Freq. Max 618.2 Hz
Mag. Min 30 dB
Mag. Max 80 dB
OPTIONS
Color Scale Default
Driver Left 1
Time [s]

Note 1: These values are module dependant. FFT Lines and Frequency Resolution are linked.

Note 2: If you use multi-touch to zoom in a display it does not change these settings.

Note 3: Every time you double tap in a display it will apply these calculation and display settings to the active display, that is, it will restore the display to the way it looked before you zoomed in, or out on it.

Comparing Multiple Files

You can open a different file in each display:

1. Touch a display to make it active. Choose the type of spectrum and channel number to be displayed in the active display:

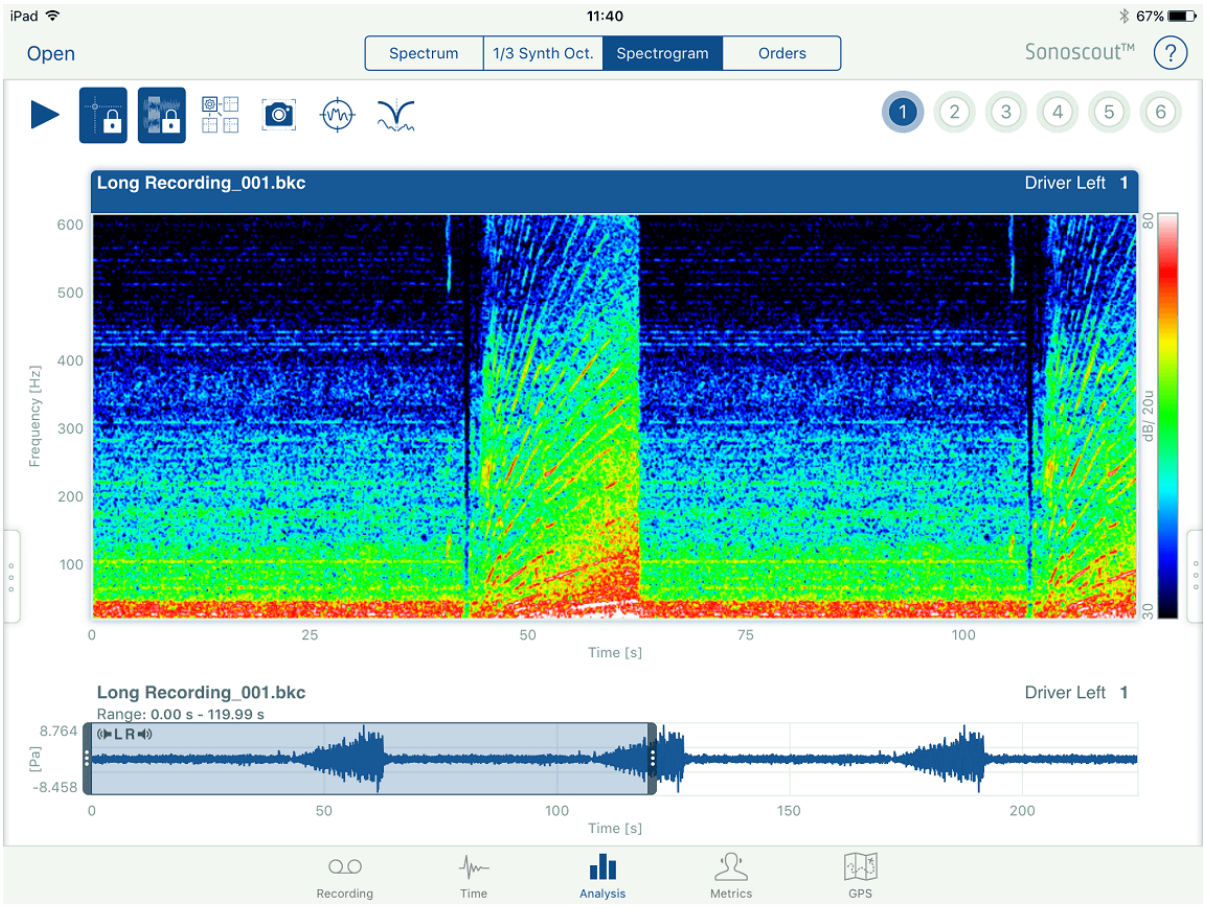
2. Use Open to select the file to be displayed in the active display.

3. Repeat this process for all the other displays.

4. In the time history you can change the range or select a specific time point, which can be different for each file/display.

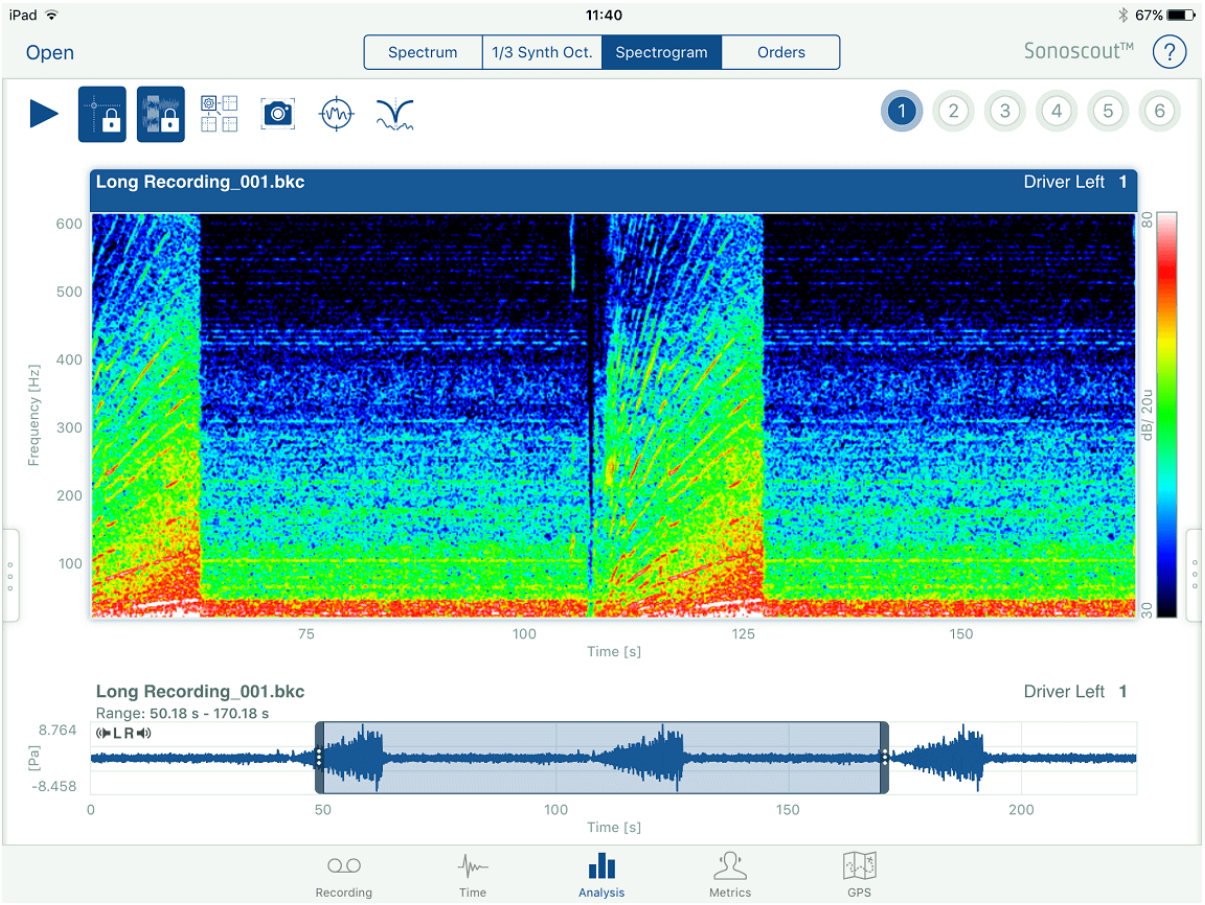
Long Files

1. If you open a file that is longer than 120 seconds, the first 120 seconds is automatically selected for spectral analysis:



2. If you touch to the right of the end of the range, the range will move to the new position but will never get longer than 120 seconds. By holding your finger down on the time history you can slide the range to right or left to move it to the desired region.

When you remove your finger the new spectrum is calculated:



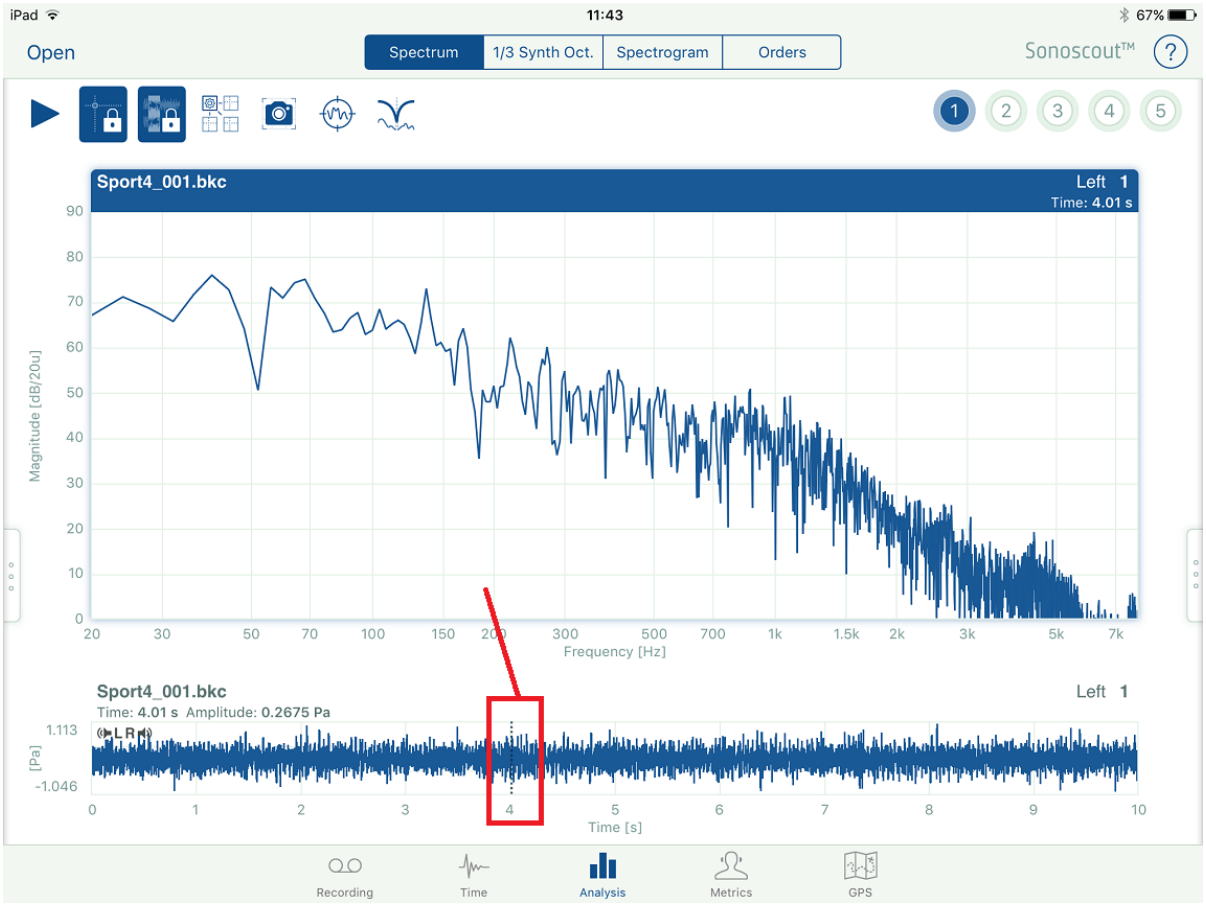
Instantaneous Versus Average Spectra

1. When you first open a file, the entire range is selected (up to a maximum of 120 seconds) and the average spectrum displayed:

iPad
11:41
67%
Open
Spectrum
1/3 Synth Oct.
Spectrogram
Orders
Sonoscout™
1
2
3
4
5
Sport4_001.bkc
Left 1
Range: 0.00 s - 10.00 s
Magnitude [dB/20u]
90
80
70
60
50
40
30
20
10
0
20
30
50
70
100
150
200
300
500
700
1k
1.5k
2k
3k
5k
7k
Frequency [Hz]
Sport4_001.bkc
Left 1
Range: 0.00 s - 10.00 s
1.113
[Pa]
-1.046
L R
0
1
2
3
4
5
6
7
8
9
10
Time [s]
Recording
Time
Analysis
Metrics
GPS

2. You can drag a range to display the average spectrum for that range:

3. If you touch to put a cursor at a point in the time history the corresponding instantaneous spectrum is displayed:



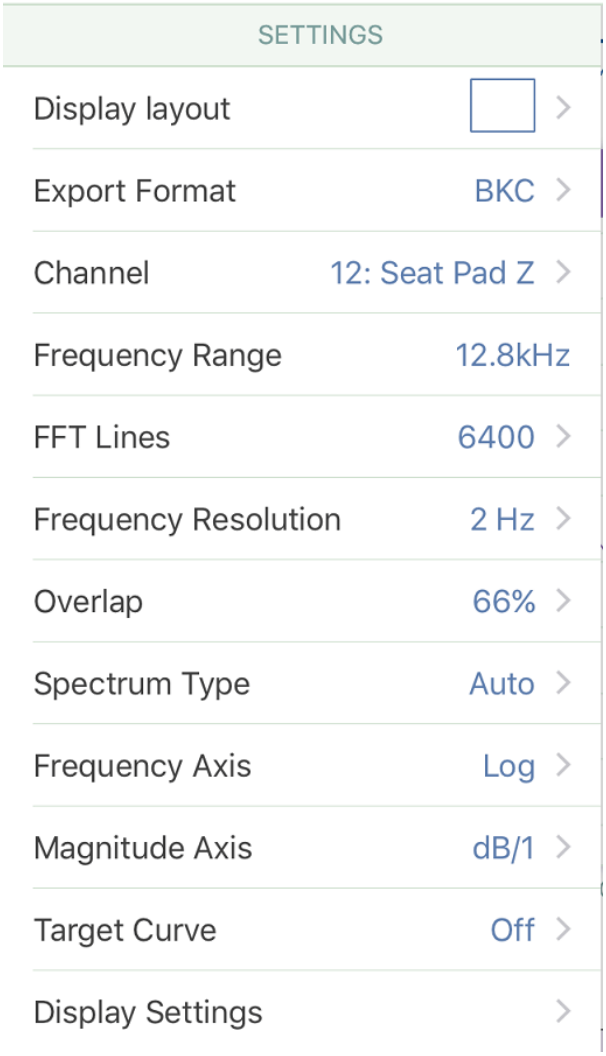
4. If you tap ▶ the sound will start playing from this point and the display will show a real-time spectrum which changes according to the position of the play cursor.

5. You can choose to display the spectrum as a PSD (Power Spectral Density) in units^2/Hz:

This is more appropriate for random signals than the Autospectrum, as it normalises by the frequency resolution of the spectrum. This means that data analysed with different resolutions can be directly compared.

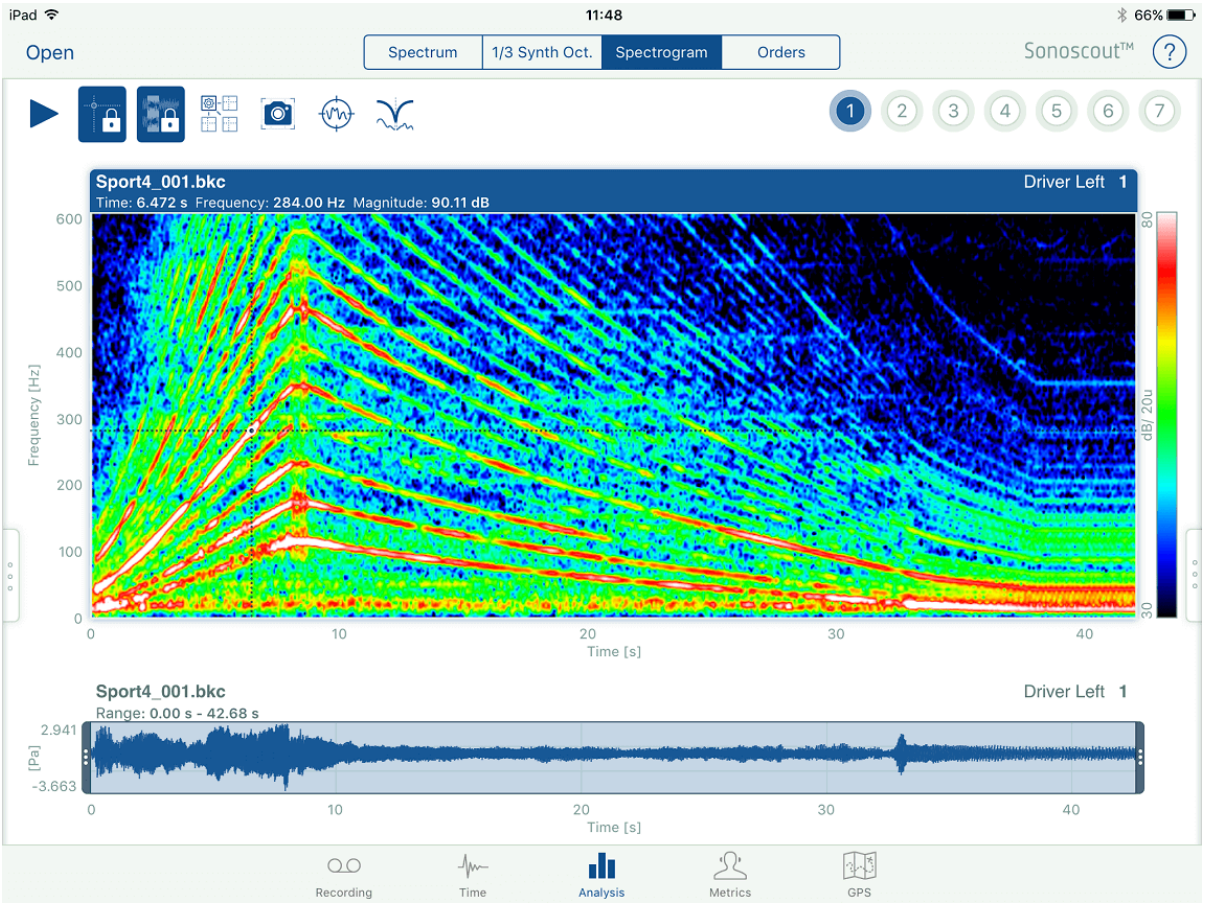
dB Reference

For non-sound pressure channels it is possible to define a reference value for the dB calculations when a dB Magnitude axis is selected. This applies to all Display types. The default value is 1. For sound pressure channels the reference value is always 20 µpa.

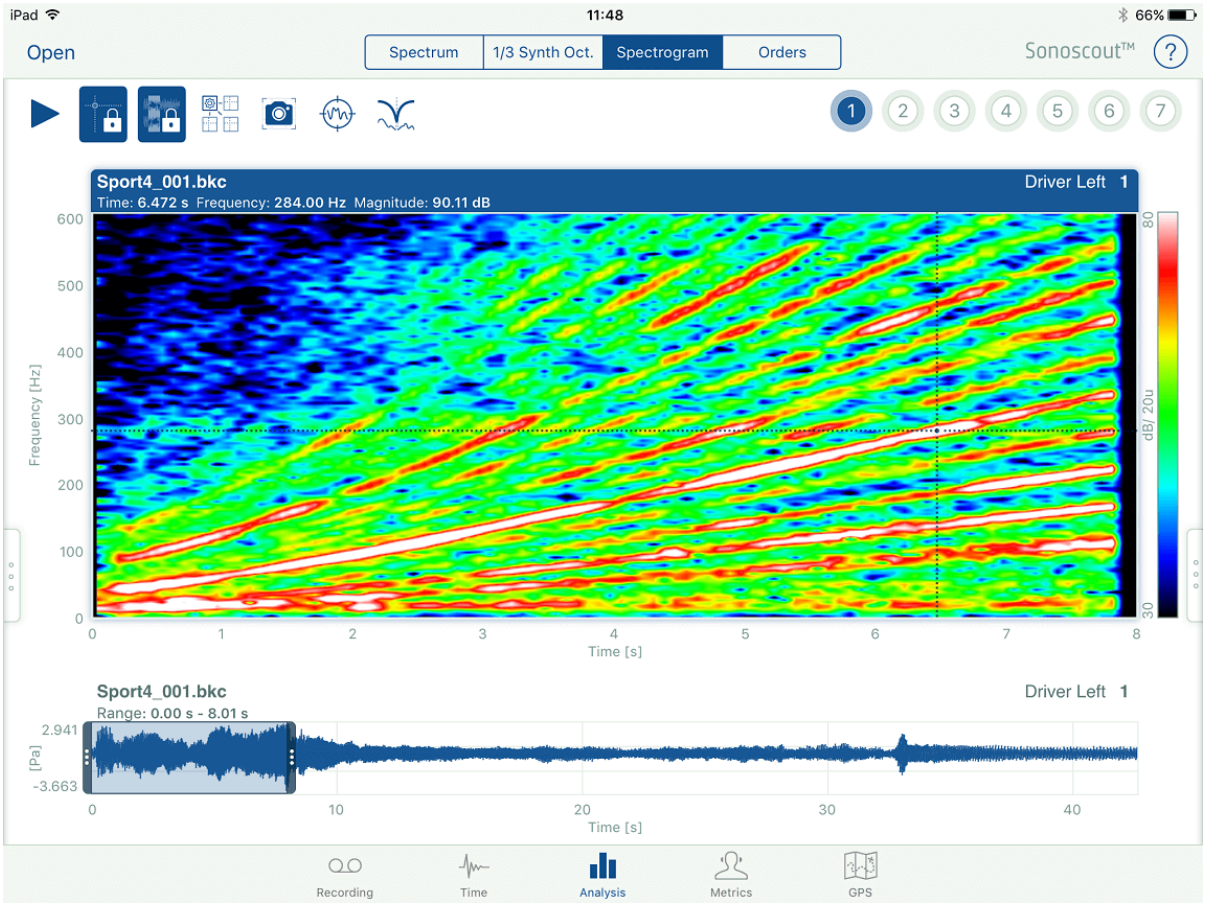


Spectrogram

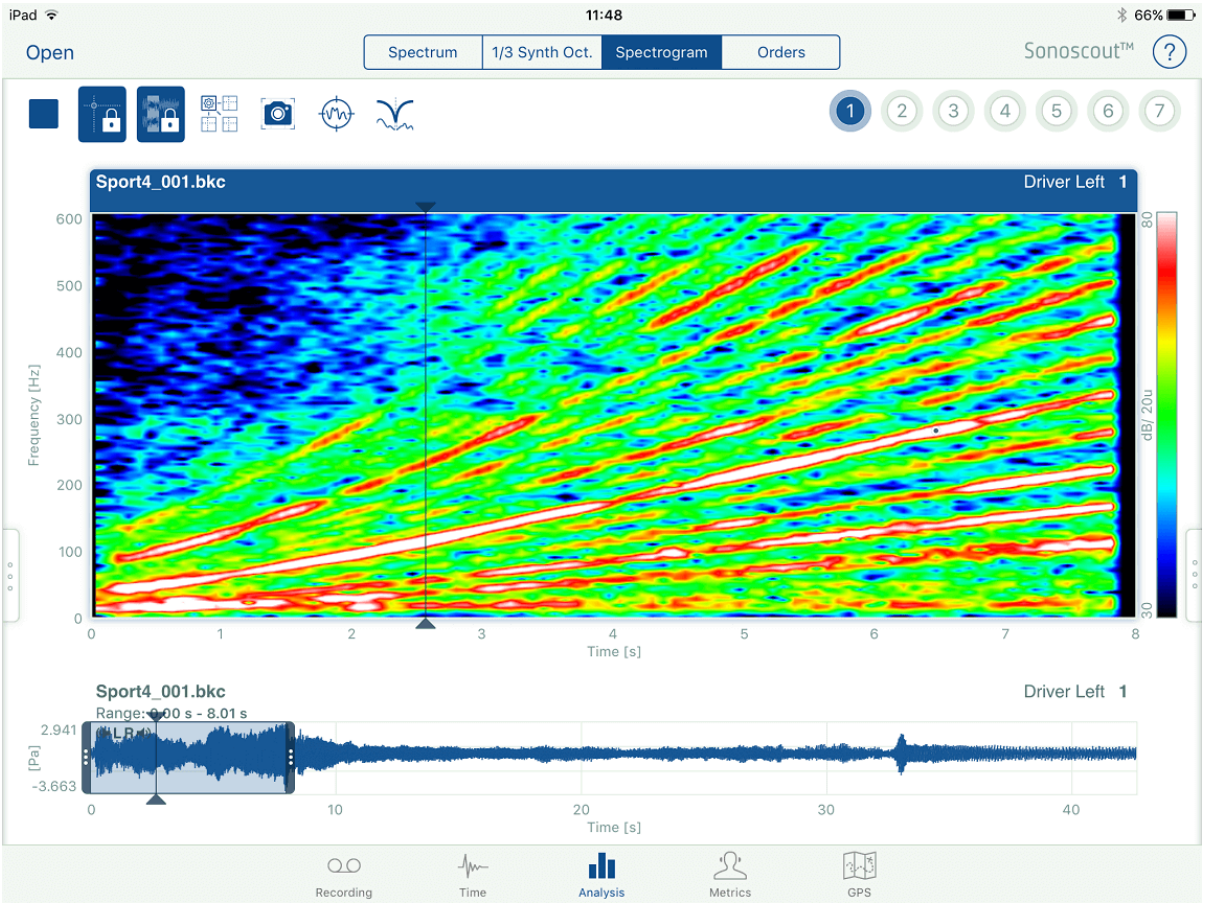
1. When you tap **Spectrogram**, the default behaviour is to display the map for up to the first 120 seconds of time data:



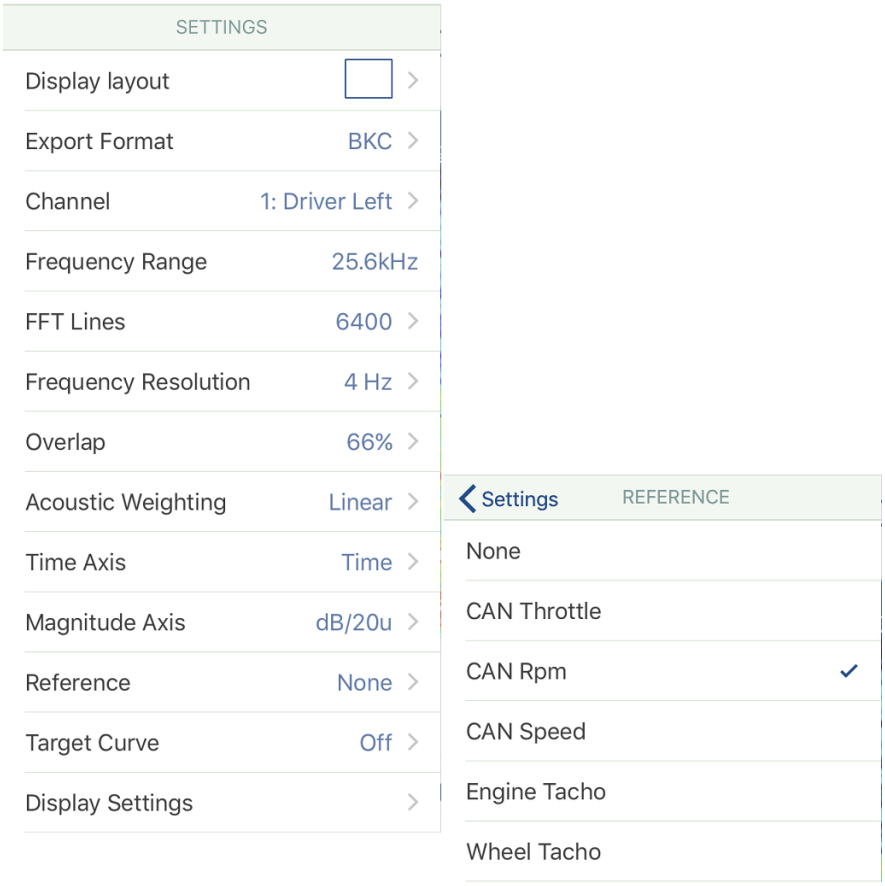
2. If you select a range in the time history, the spectrogram is calculated over the same range. There is a cross-hair cursor which follows your finger as you move it around on the display:

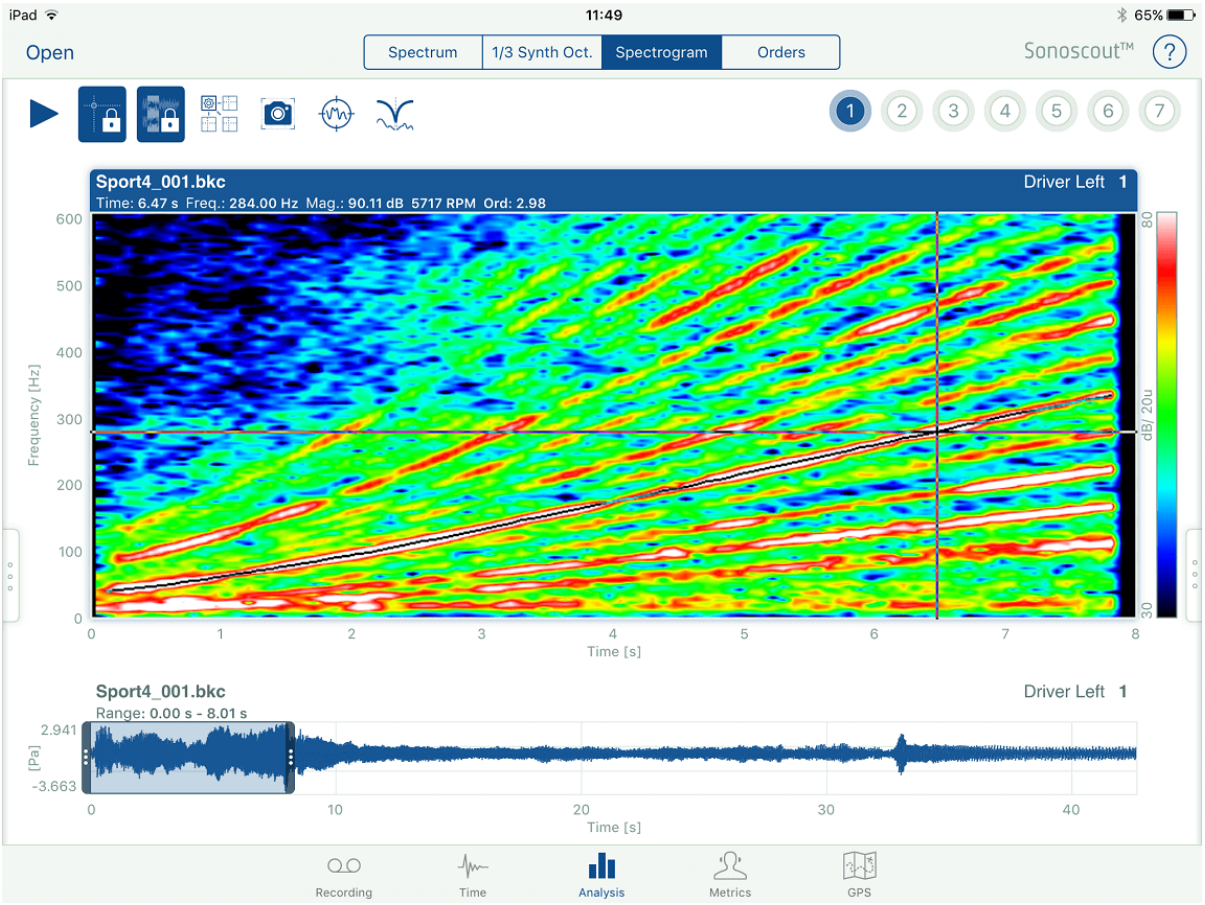


3. If you play the selected channel, a play cursor moves through the time history and the spectrogram:

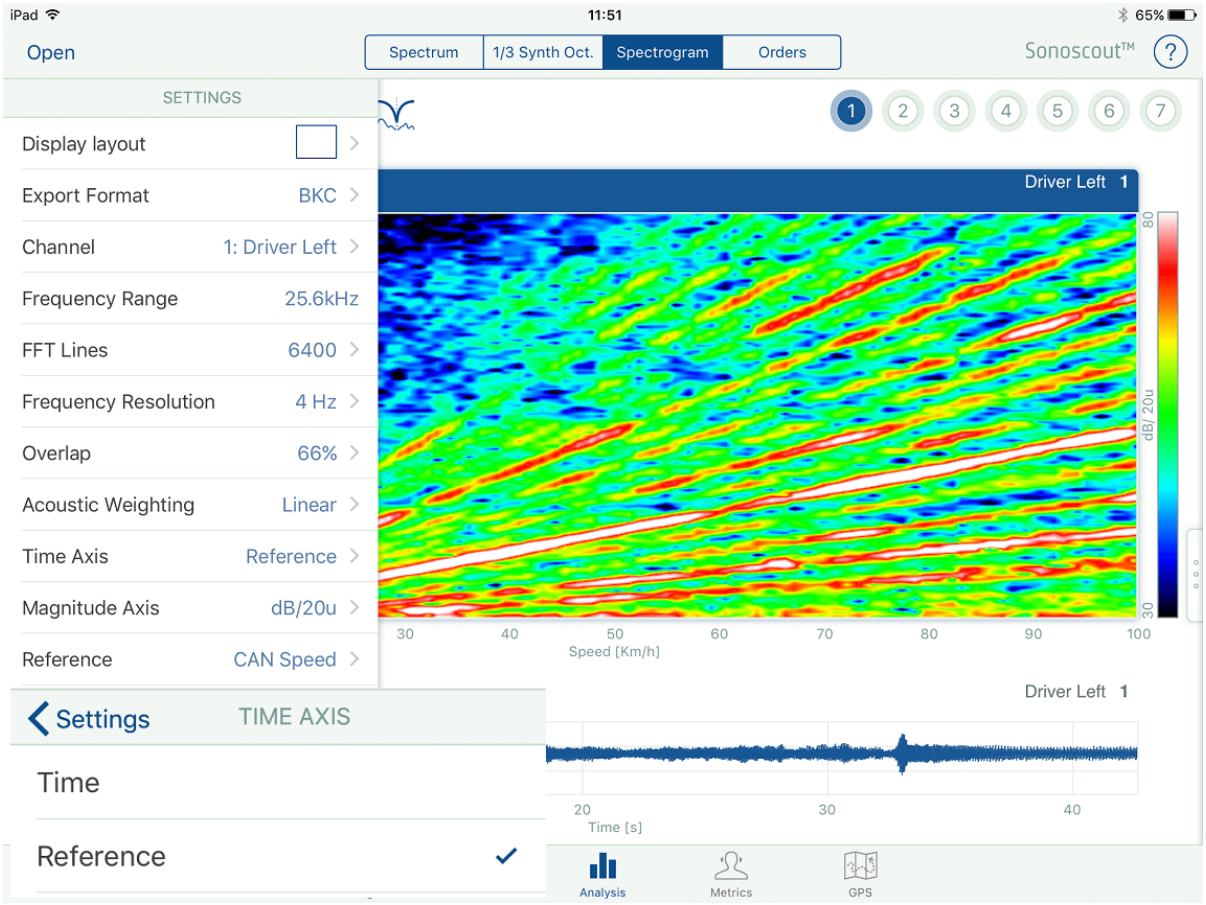


4. If you choose a Reference profile (all those available are shown under *Reference* in the settings menu), an additional order cursor is displayed and the Order number for the current cursor position is shown along with the other cursored values. A legend and cursored value for Total is included:

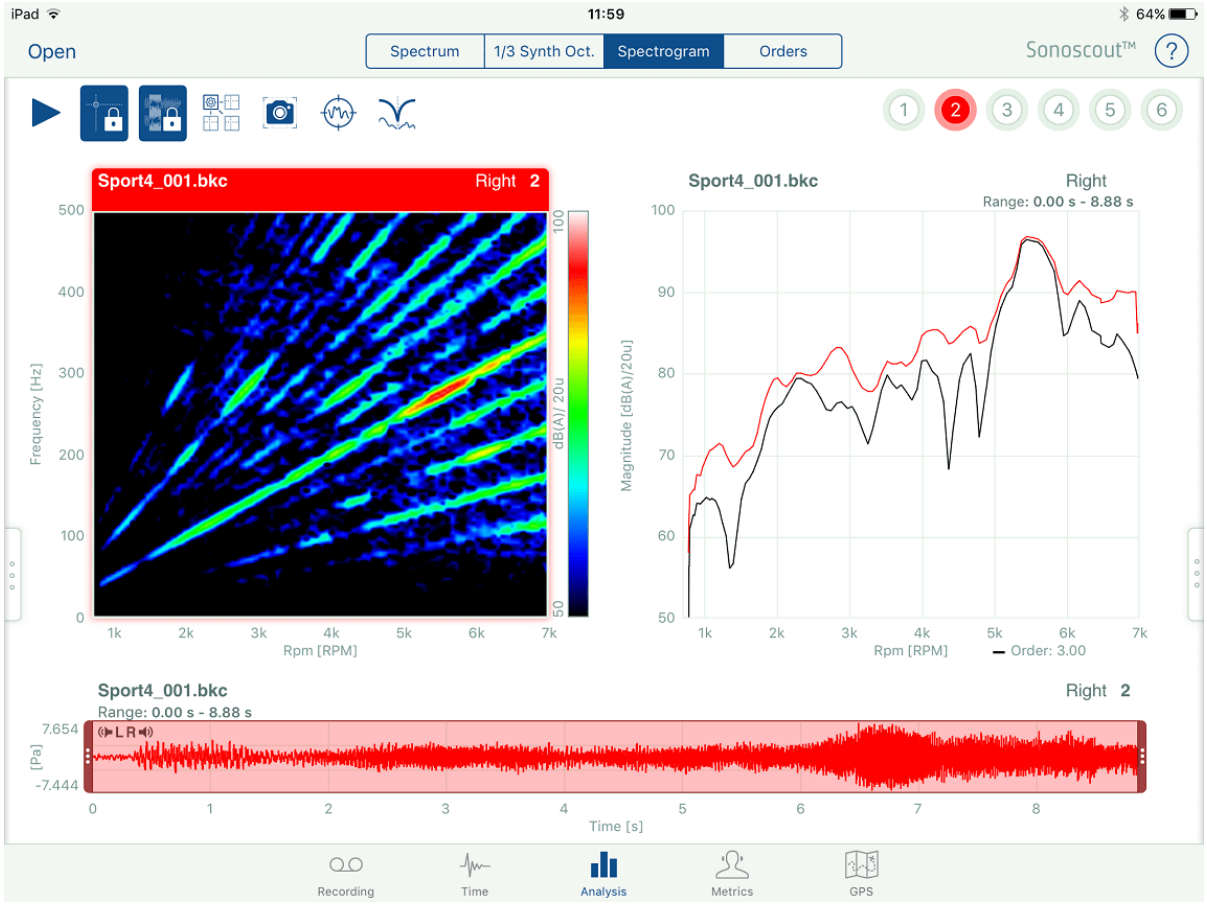

SETTINGS
Display layout
Export Format BKC
Channel 1: Driver Left
Frequency Range 25.6kHz
FFT Lines 6400
Frequency Resolution 4 Hz
Overlap 66%
Acoustic Weighting Linear
Time Axis Time
Magnitude Axis dB/20u
Reference None
Target Curve Off
Display Settings
Settings
REFERENCE
None
CAN Throttle
CAN Rpm
CAN Speed
Engine Tacho
Wheel Tacho



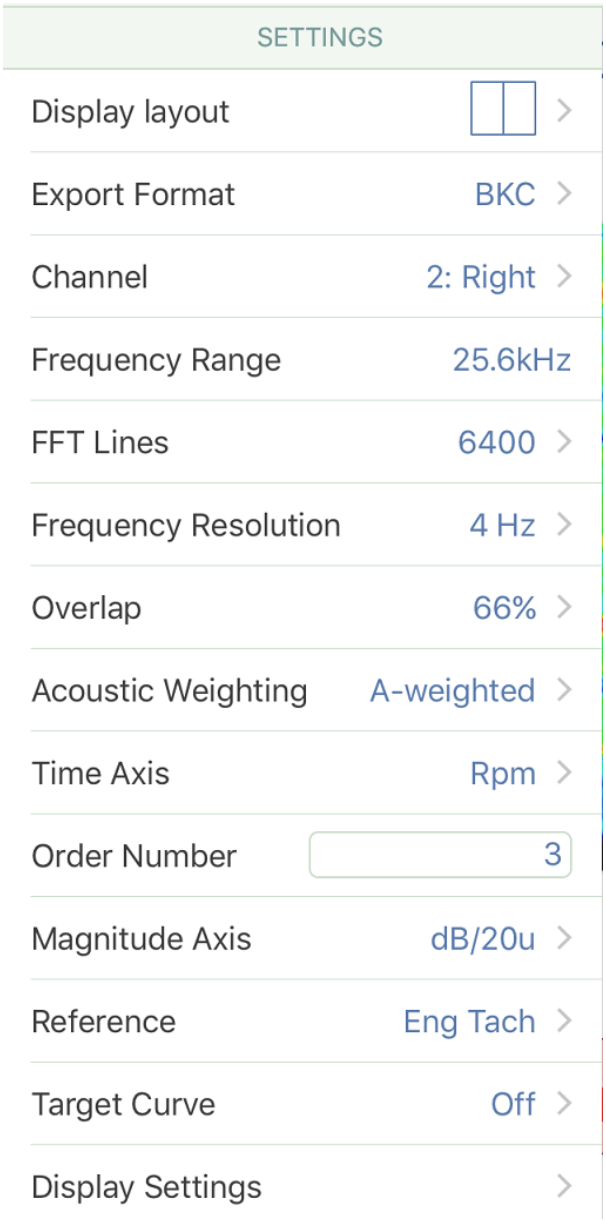
5. There are two options for the Time Axis: *Time* and *Reference*. If you choose *Reference* it automatically displays the x-axis in the units of the selected reference, for example, speed:



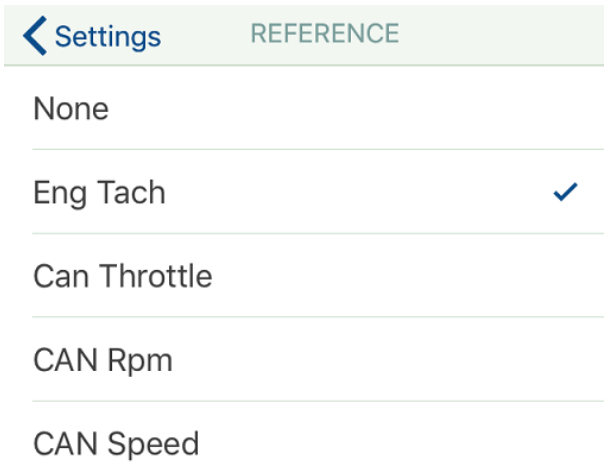
Order Analysis


iPad
11:59
64%
Open
Spectrum
1/3 Synth Oct.
Spectrogram
Orders
Sonoscout™
1
2
3
4
5
6
Sport4_001.bkc
Right 2
Frequency [Hz]
Rpm [RPM]
dB(A)/ 20u
Sport4_001.bkc
Right
Range: 0.00 s - 8.88 s
Magnitude [dB(A)/20u]
Rpm [RPM]
Order: 3.00
Sport4_001.bkc
Right 2
Range: 0.00 s - 8.88 s
[Pa]
Time [s]
Recording
Time
Analysis
Metrics
GPS

1. Use the Settings menu to set up the calculation and display parameters:

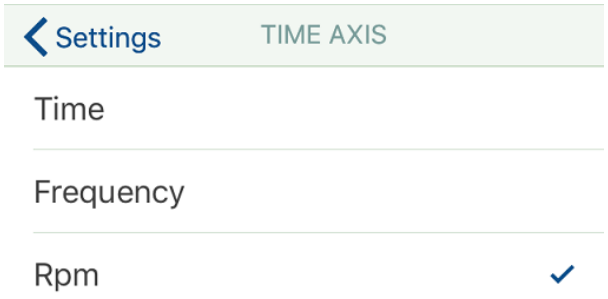


2. Tap on *Engine Tacho* or profile channel to use as the reference for cutting the order and displaying the result:

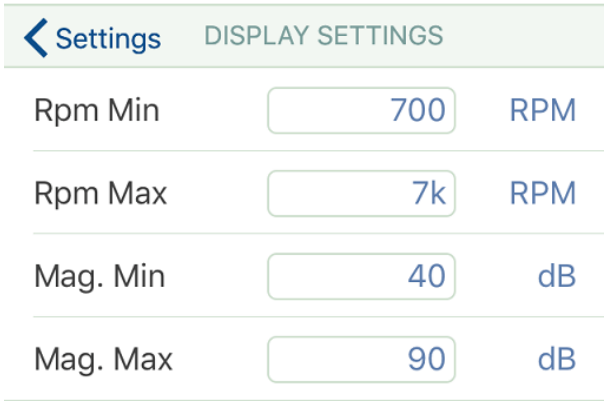


Note: The smoothing factor used during the recording is applied to the tacho rpm profile.

3. Specify the x-axis type:

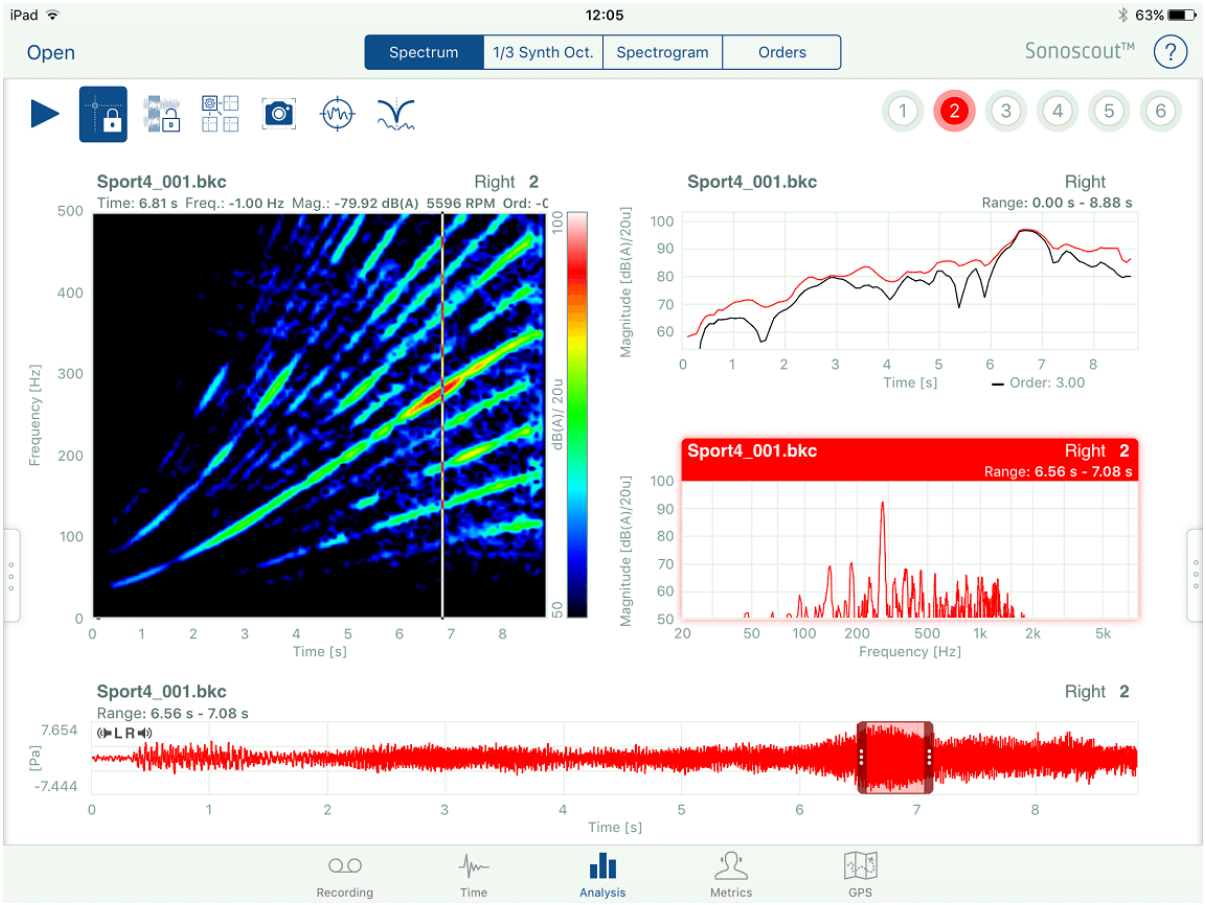


4. Enter the default values:



Play and Cursors

1. If you tap the **Play** button you will hear the sound for the file/channel in the active display:



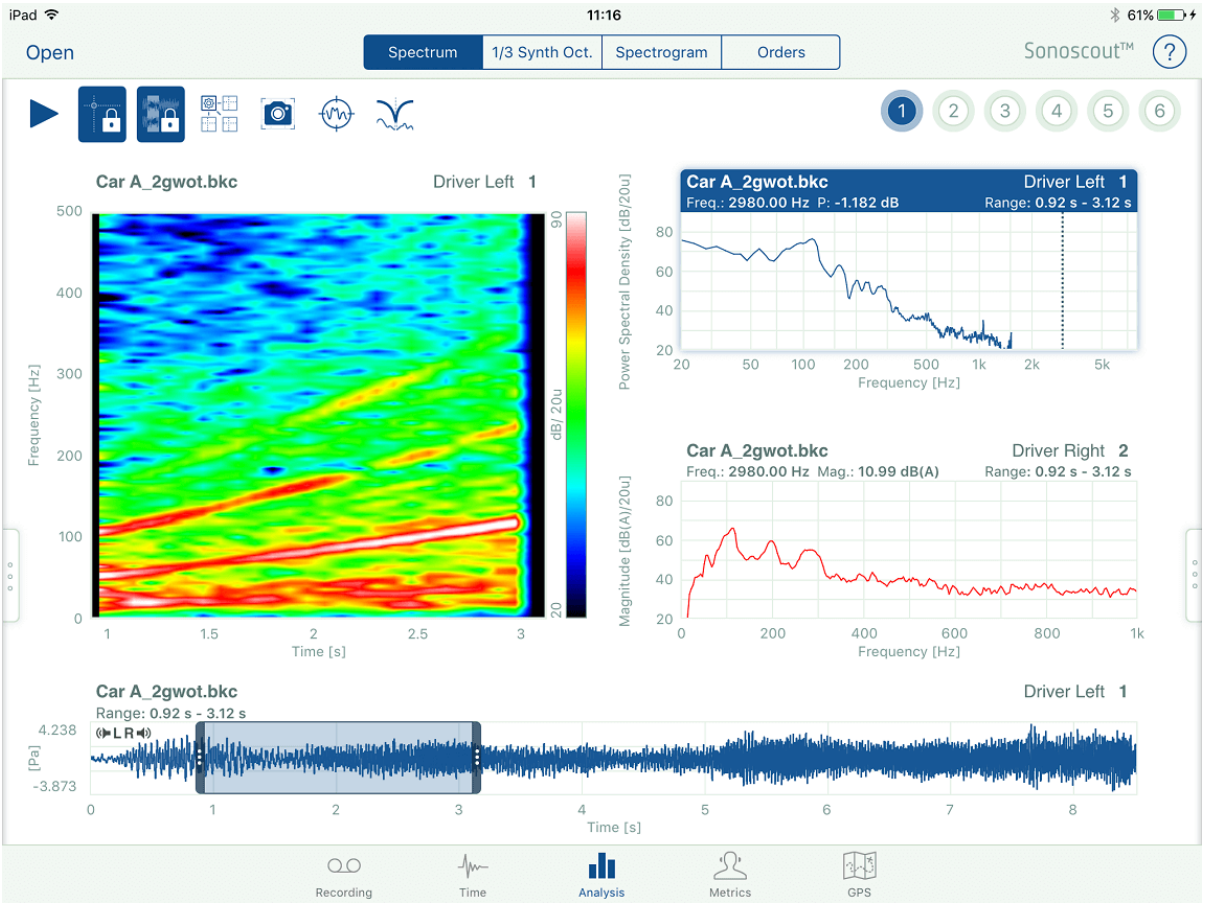
2. If this is a spectrum or 1\3-octave signal, you will see a real-time display which is synchronised to the play cursor in the time history. If the sound is not playing, the instantaneous spectrum is synchronised to wherever you position the cursor.

3. If it is a spectrogram there are synchronised play cursors in the spectrogram and time history (see [1] above).

4. If the **Cursor Synchronisation** button is off, the cursors are independent in each spectral display. If the button is on, the cursors are linked in each spectral display.

Range Synchronisation

1. If the **Range Synchronisation** button is off, each display can have a different range. If the button is on, each display from the same file as the active display has the range defined by the active display.



Note: This range is not applied to any other files which are currently open.

Propagate Settings

1. The **Propagate Setting** button allows you to apply the current settings from one display to all the other displays of the same type.

2. Calculation settings are applied to all displays.

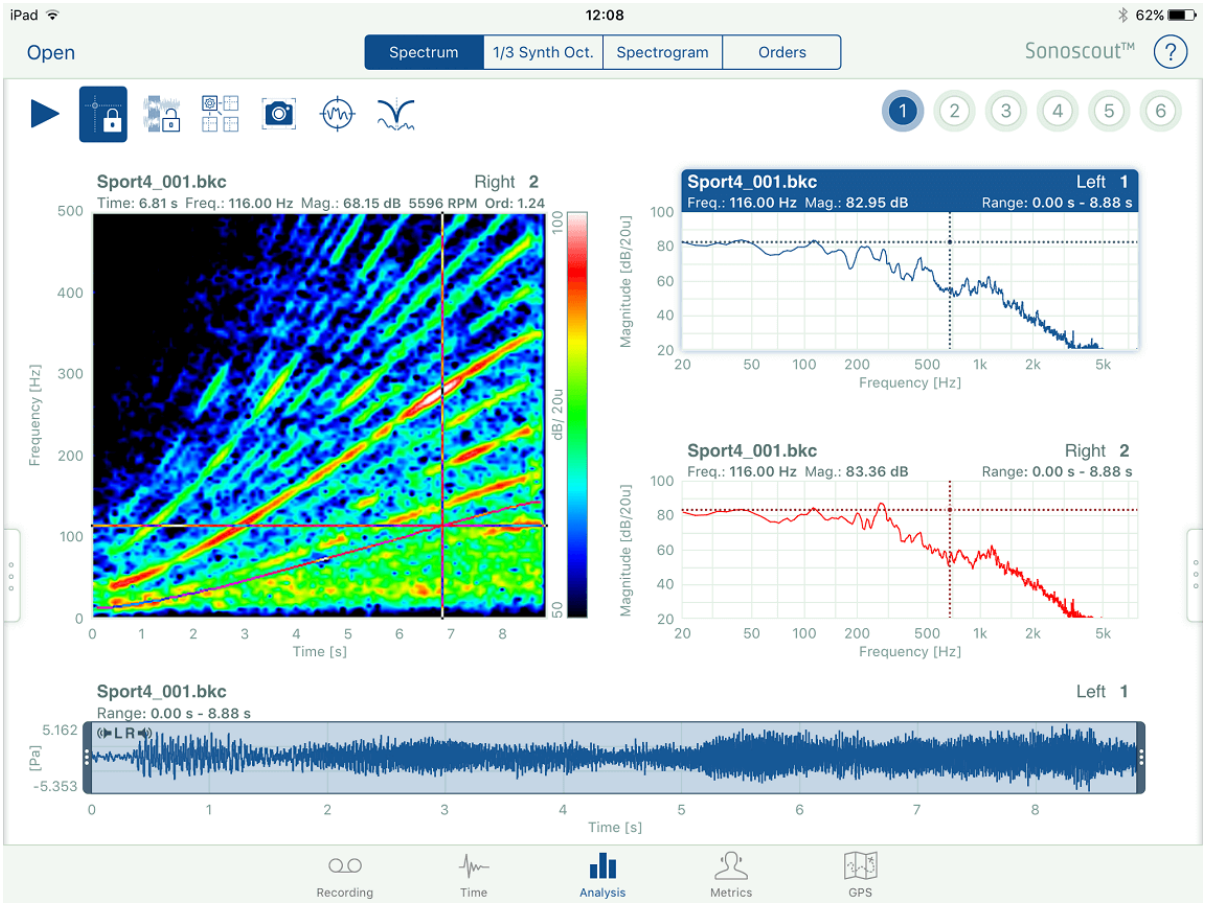
3. Display settings are dependent on display type, for example, if the active display is a spectrogram it propagates the settings to any other spectrograms that are currently displayed.

4. The new settings will be used as the defaults for all new displays.

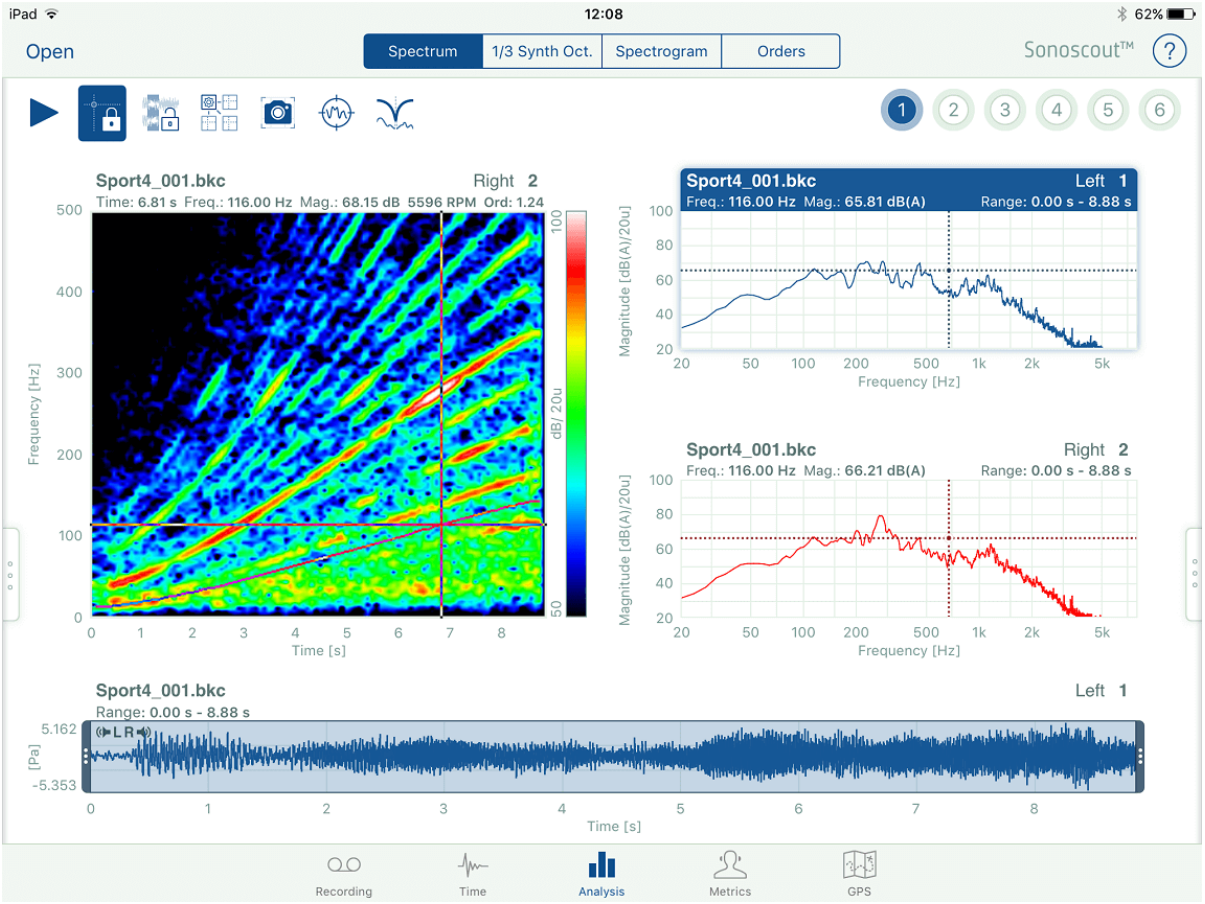
5. The system only propagates values from the forms, it does not propagate any zooming you may have done in a display using multi-touch.

   In the examples below, the weighting has been changed from *Linear* to *A-weighting* and this has been automatically applied to the other displays by using the **Propagate Settings** button.

   Display showing Linear weighting (before **Propagate Settings** button selected):

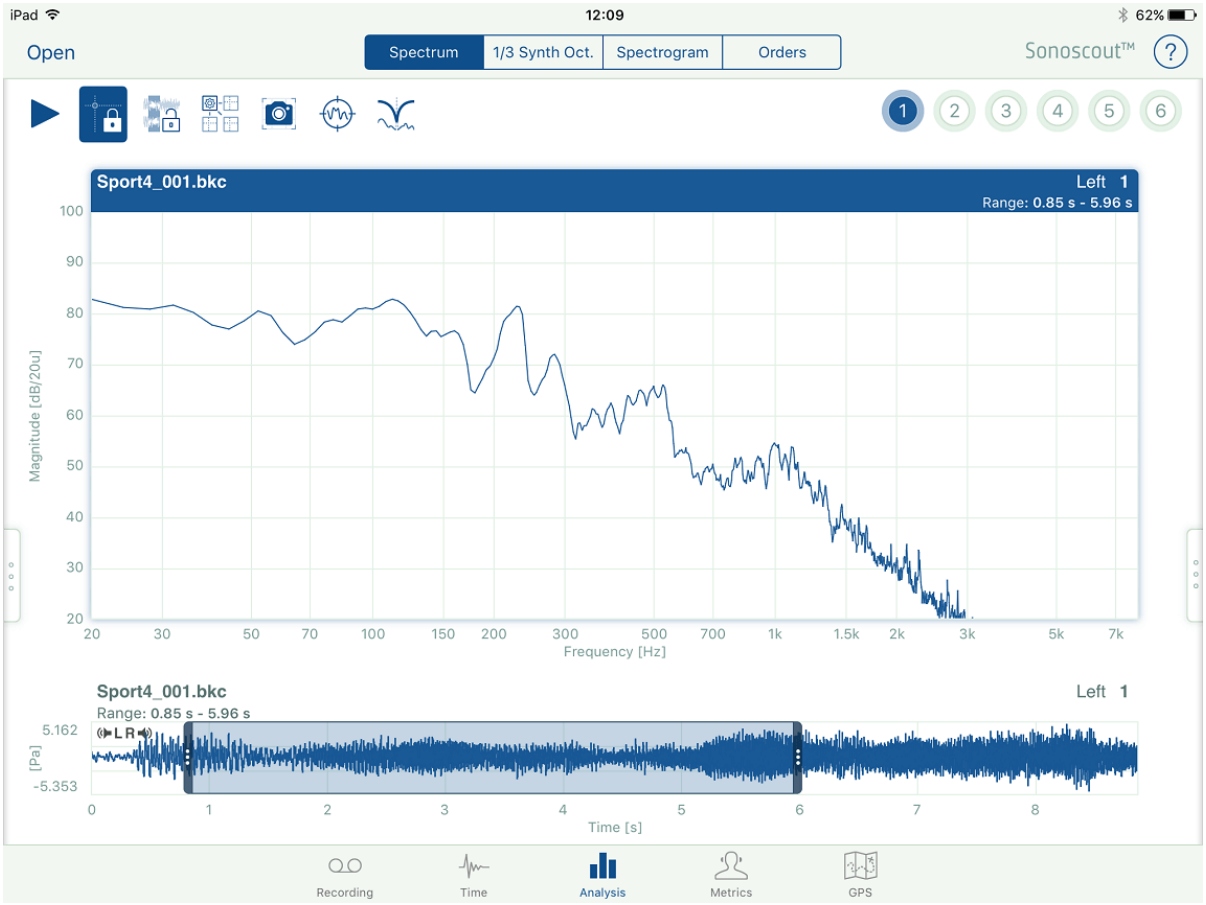


   Display showing A-weighting (after **Propagate Settings** button selected).



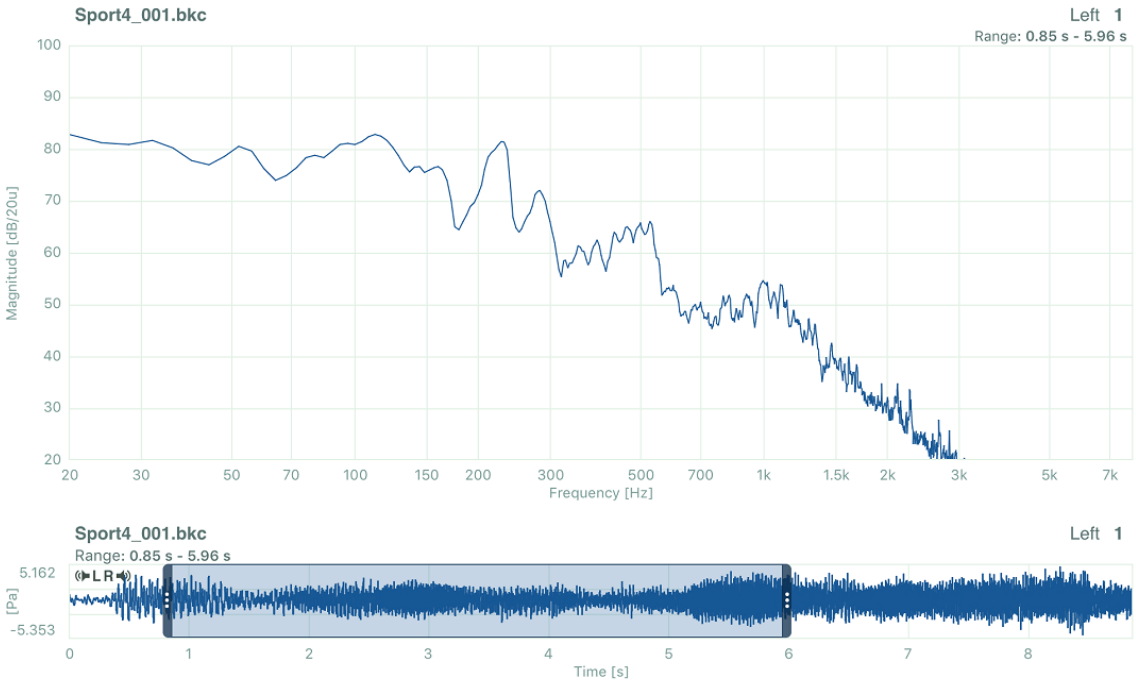
Taking Screenshots

1. You can take screenshots on the mobile device using standard Apple® functionality (pressing the **Home** button and **Power** button simultaneously):

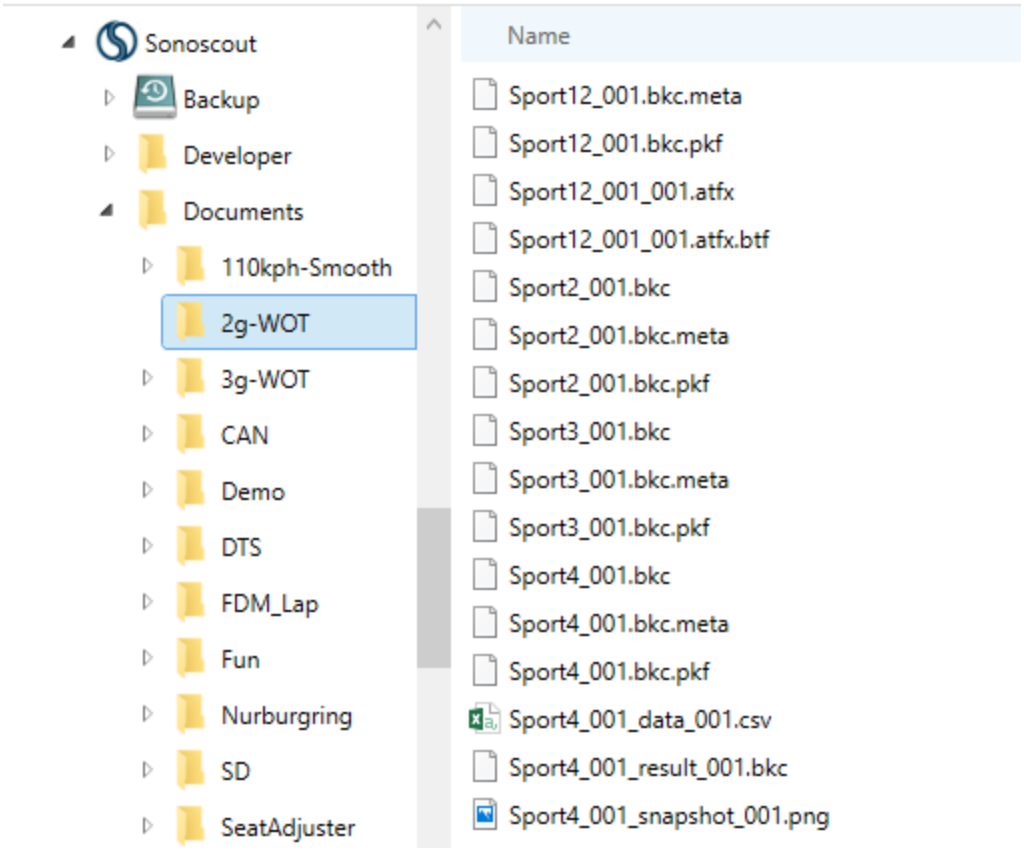


2. Or, you can use the button in this task (and the Metrics task).

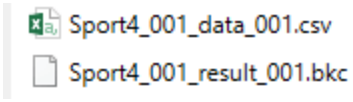
   The built-in 'camera' offers certain advantages. The first is that the pictures are report ready (that is, no trimming is required) and the highlighted title bar, which indicates the currently active window, is removed:



The second is that the pictures are automatically stored in the same folder as the original file and have the same base-name as the original file:



The third is that for all display types, other than Spectrogram, the content of the Active display is saved as a .csv or .bkc file which has the same name as the image file:

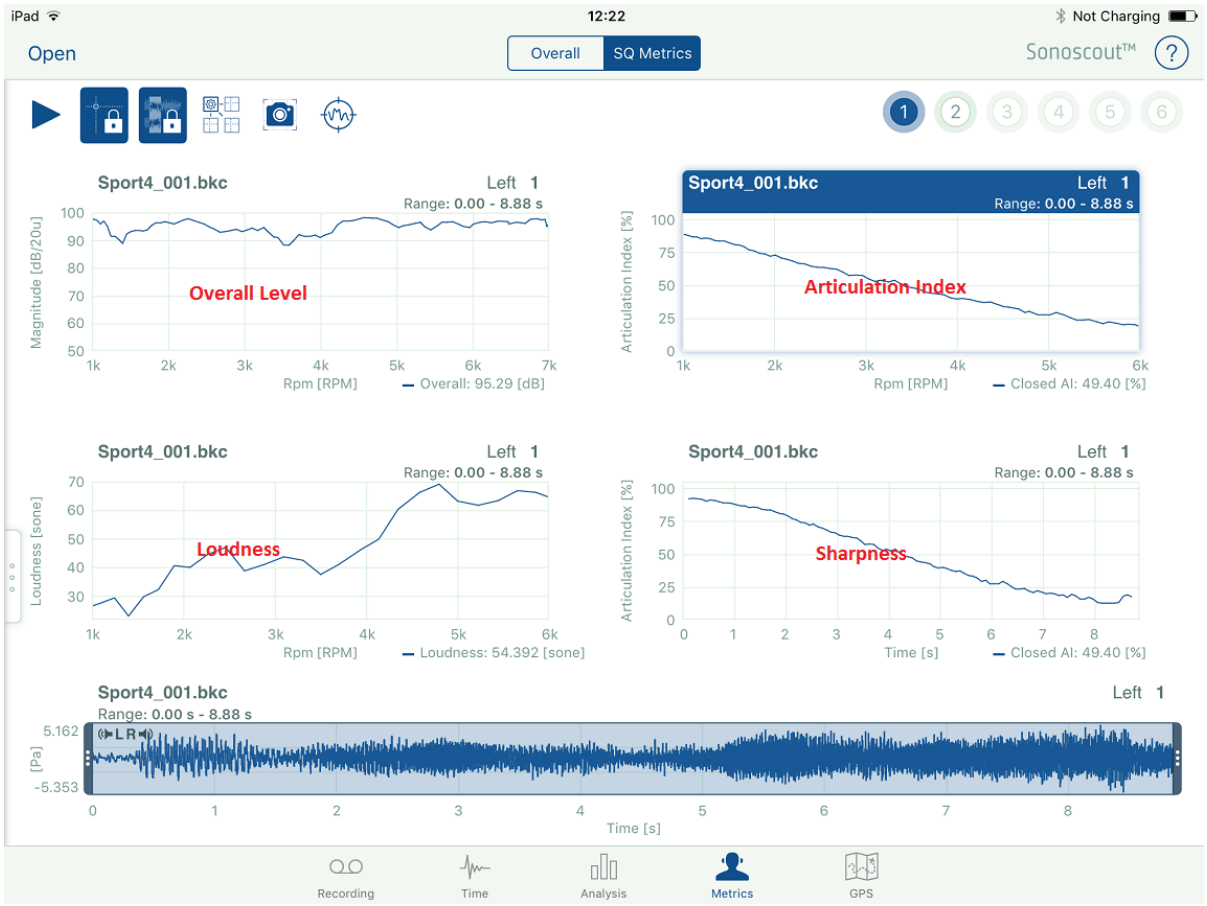


Viewing Metrics

This task provides some simple metrics, as follows:

- Overall or Level in a Band level as a function of time, RPM or speed
- Articulation Index, Loudness or Sharpness as a function of time, RPM or speed
- Average Loudness as a Critical Band Spectrum
- Average Sharpness as a Critical Band Spectrum
- Export results to BKC or CSV
- The options available and calculated results are the same as in PULSE™ Reflex
- Select 1,2,3,4 curves to overlay in a single display
- Create and display Target curves with tolerance bands

In each case the results are presented as curves or as the average value for the selected range:



Loudness and Sharpness use a CPB calculation, but Articulation uses 1/3-octave data synthesised from the FFT.

The options available and calculated are the same as in PULSE™ Reflex.

The display functionality is exactly the same as in the Analysis task.

Target Curve and Overlay in Metrics

The Target Curve and Overlay Display functionality for Metrics is the same as in the Analysis task.

For example the figure below shows 'AI vs. RPM' plotted for a wide open throttle test in 3 cars, with the target curve also displayed.

Note: In this version there is no multi y-axis functionality for Metrics, so it is not possible to plot, for example, AI and Loudness on the same graph.

Viewing GPS

The GPS task allows you to view the GPS coordinates of the currently opened file, display the real-time speed profile, or, if you have an Internet connection, you can display a hybrid map with start and end positions marked.

Additionally, you can convert the GPS Speed to a Speed Profile channel and add to the time file, or export the file as a keyhole markup (KML) file.

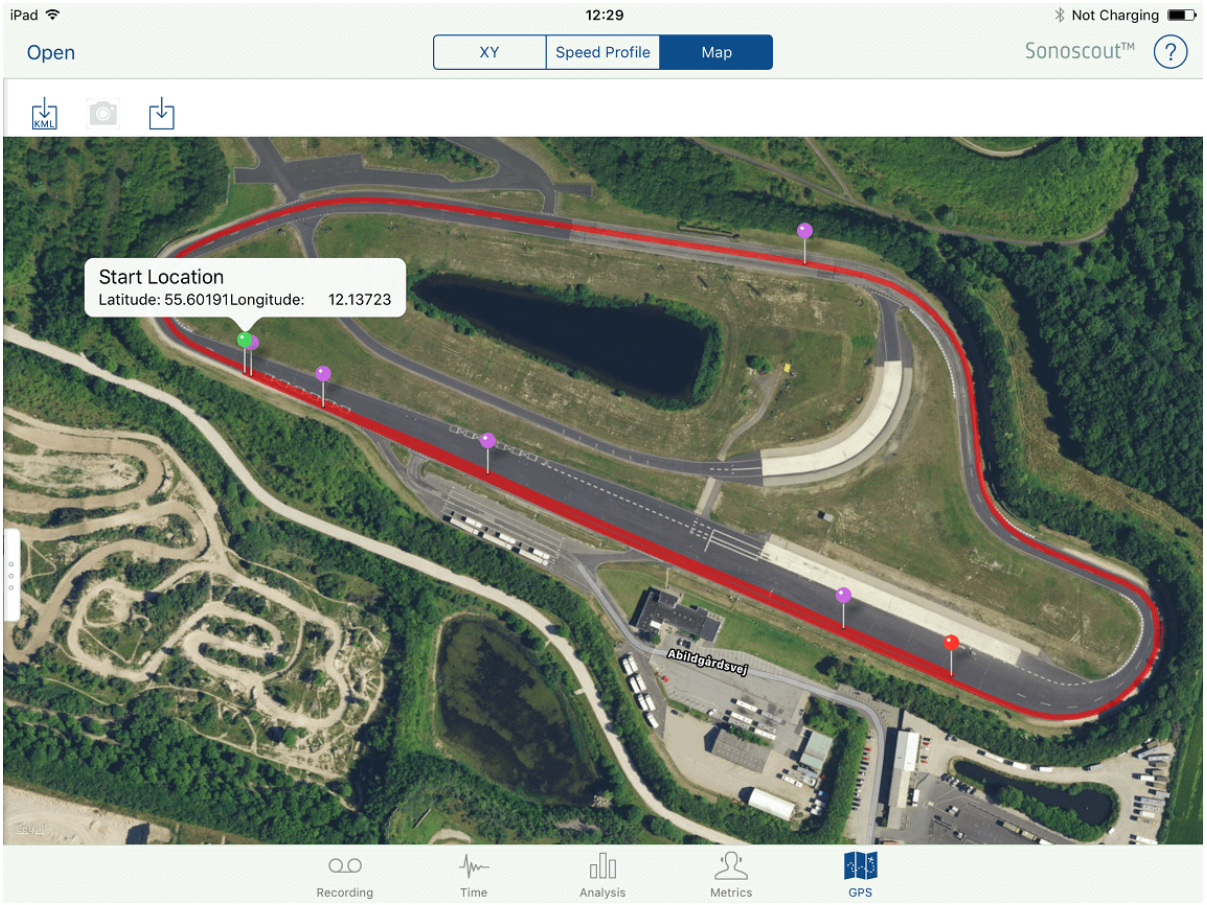
The following options are available:

1. Display the X-Y coordinates:

2. Display the Speed Profile:

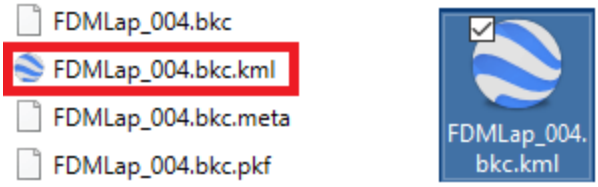
3. If you want to 'embed' the profile as an additional channel in the file tap :

4. If you have an Internet connection, tapping the **Map** button will display a hybrid map with the x-y coordinates and start and end positions marked:



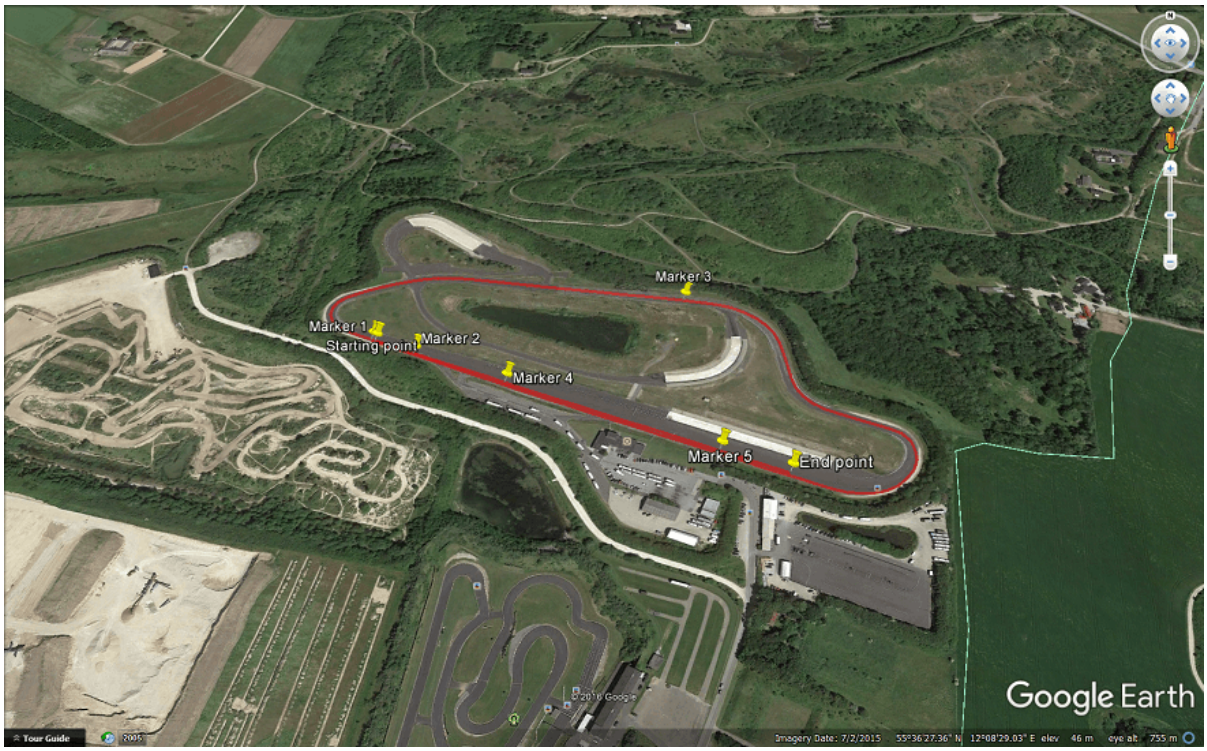
Note: This is not possible if you are connected to the wireless router in the module.

5. Tap KML to export the GPS data as a KML (Keyhole Markup File). This is automatically stored in the same folder as the original file and has the same base-name as the original file:



6. Copy the KML file to your PC. If you have Google Earth™ installed, double-click on the KML file and it will show you the measured route (including markers) superimposed on

the satellite view:



Target Curves

Create, import and display target curves, which can then be shown in any 2D display in the Analysis and Metrics tasks. You can display the target as a single curve or as two curves offset by +/- a user-defined value. You can also delete target curves when done.

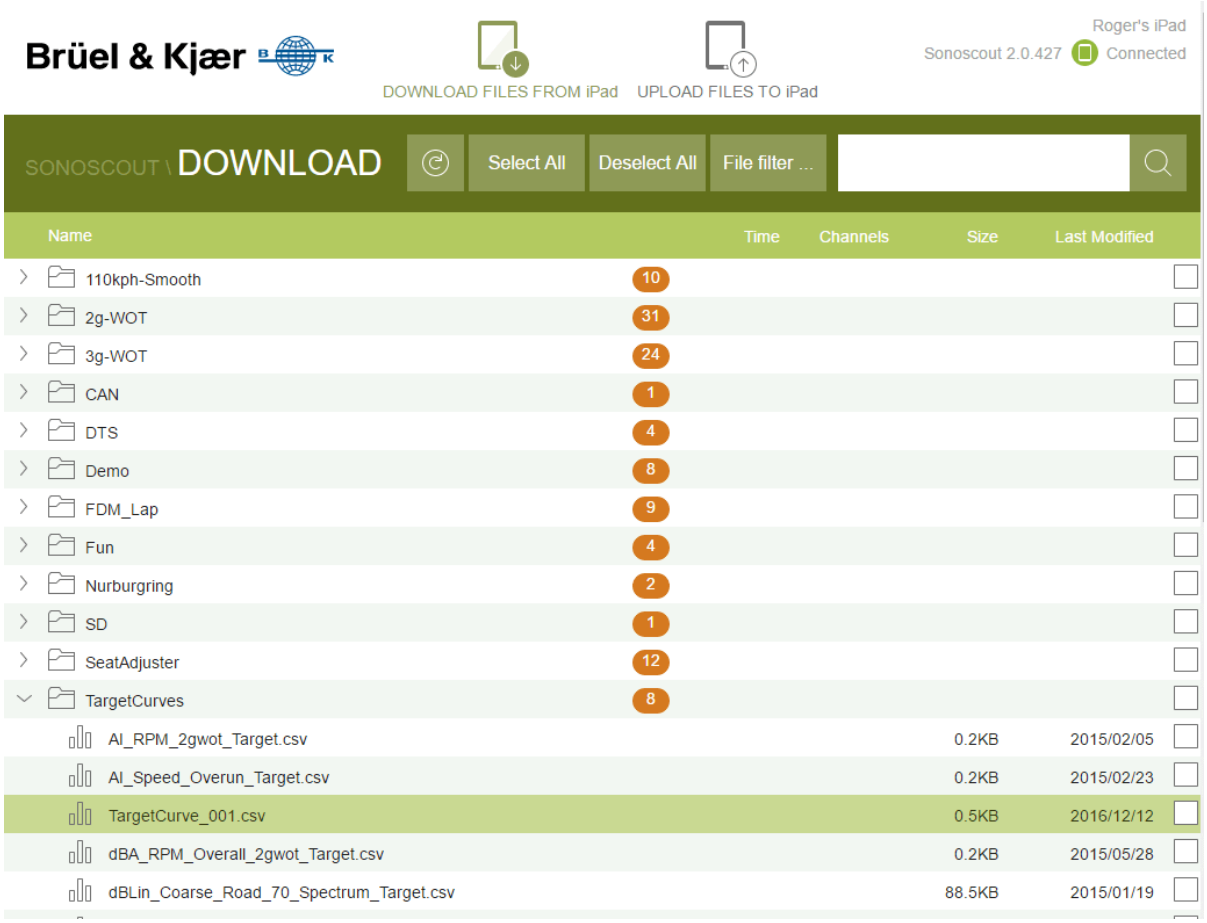
From the Settings menu, set Target Curve to *Active*:

Creating and Importing Target Curves

Method 1

1. Tap the target button to save the current 2D display as a target curve (.csv file) in the *TargetCurves* folder:

View the *TargetCurves* folder:



Method 2

1. You can also create target curves on your PC in Excel® and upload them to the *TargetCurves* folder for use in Sonoscout.

   Examples of target curve files created in the app (using Method 1) are shown below:

Blackcar 3rd Gear.BKC		
Source: Sonoscout - Analysis - Orders		
Channel: RHS Inner Ear		
	Order: 2.00	Total
Rpm [RPM]	Magnitude [dB/20u]	Magnitude [dB/20u]
765.724	98.0913	99.3331
781.77	102.724	103.153
807.687	106.804	107.097
832.771	106.801	106.995
858.188	105.822	106.116
882.909	104.646	104.974

Blackcar 3rd Gear.BKC	
Source: Sonoscout - Analysis - 1/3rd Octave	
Channel: RHS Inner Ear	
Range: 0.00 s - 59.00 s	
Frequency [Hz	Magnitude [dB/20u]
20	
25	
31.5	
40	88.2268
50	83.3125
63	80.9347
80	77.5644
100	80.6872
125	83.4606

Car A_2gwot.bkc	
Source: Sonoscout - Metrics - Articulation Index	
Channel: Driver Left	
Range: 0.00 - 8.52 s	
Speed [Km/h]	Articulation Index [%]
12.8767	96.1776
12.8781	96.8717
12.8806	97.2298
13.4096	95.6506
13.7315	96.3092

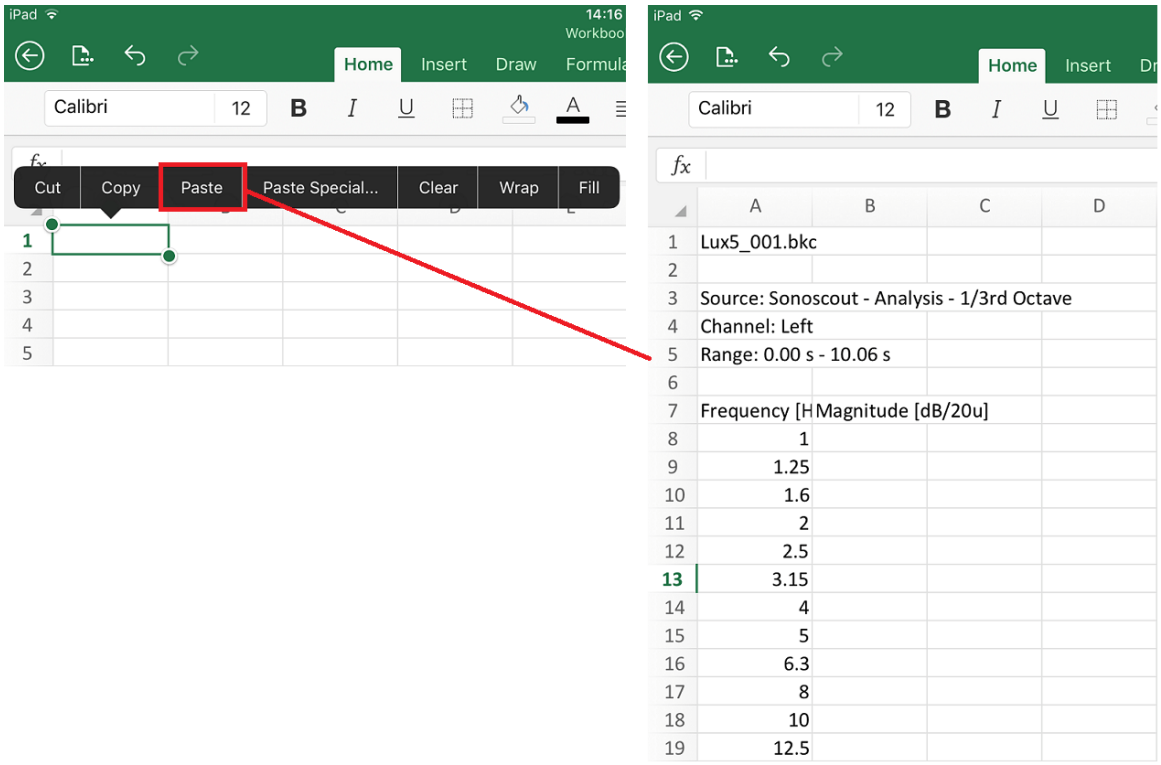
Blackcar 3rd Gear.BKC	
Source: Sonoscout - Analysis - Auto Spectrum	
Channel: RHS Inner Ear	
Range: 0.00 s - 59.00 s	
Frequency	Magnitude [dB/20u]
0	94.8447
2	94.1867
4	91.3118
6	87.0569
8	85.8407
10	86.8143
12	92.0076

Each display type generates a unique file format. The display type is defined in the *Source:* cell in the table, for example: *Source: Sonoscout - Analysis- Orders* (see above). If you manually create a target curve in Excel® it must match one of the standard formats.

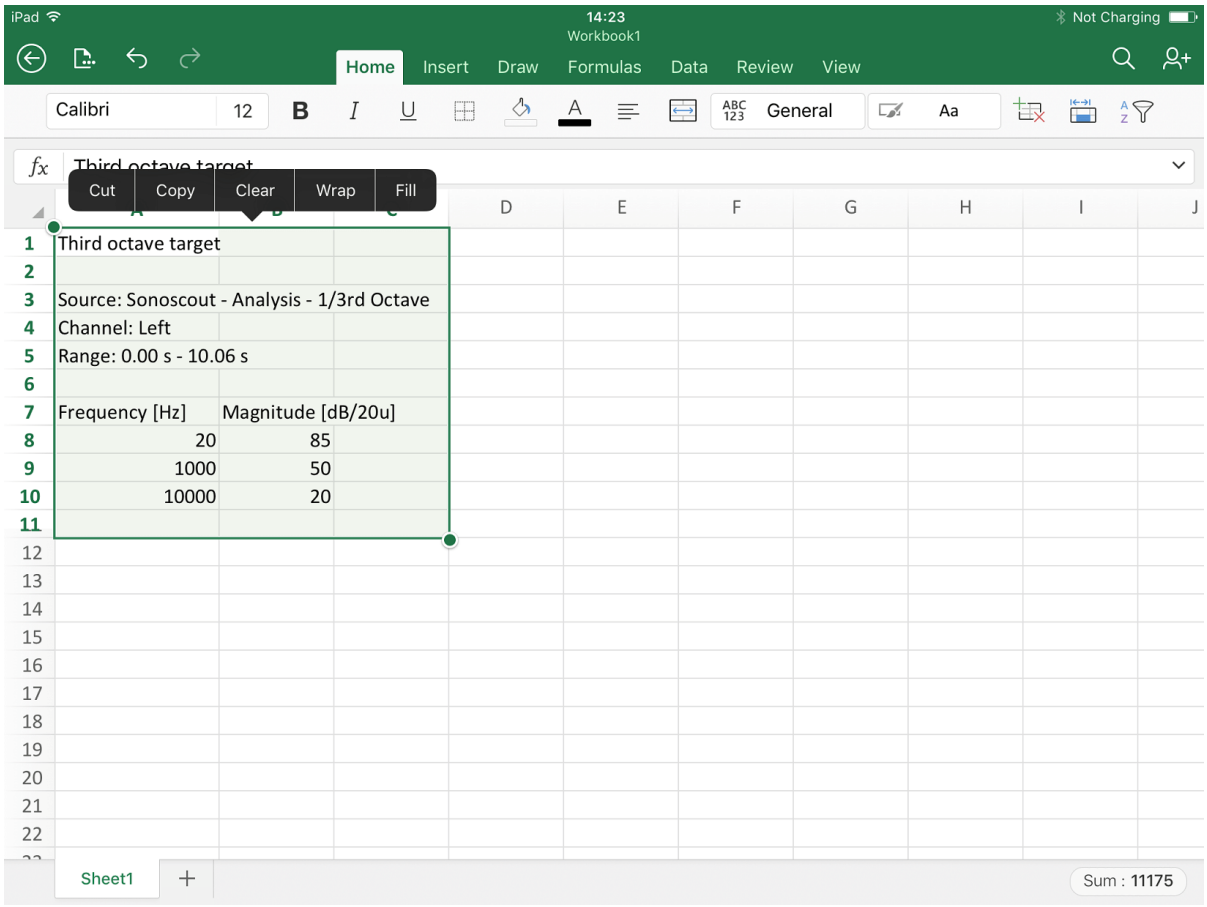
Method 3

1. Touch and hold the target button, then select the *Copy* option to copy the current 2D display to the iPad clipboard:

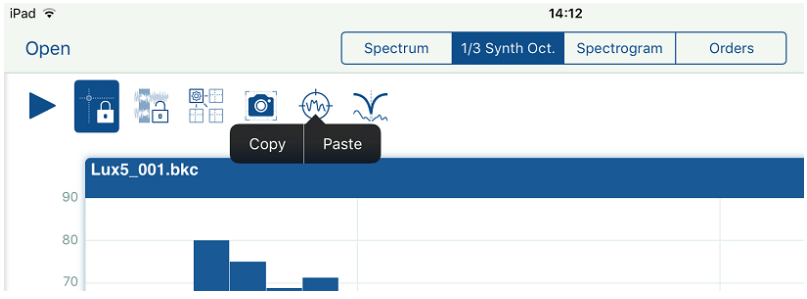
2. Start Excel®on the iPad, select a cell and tap *Paste:*



3. Edit the data to generate your own target, then select the data entries:



4. Re-open Sonoscout, touch and hold the target icon and select the *Paste* option :



This will save the target as a .csv file in the *TargetCurves* folder.

All target .csv files saved from Sonoscout will be called *TargetCurve_00N.csv* where N is an incrementing number.

Displaying Target Curves

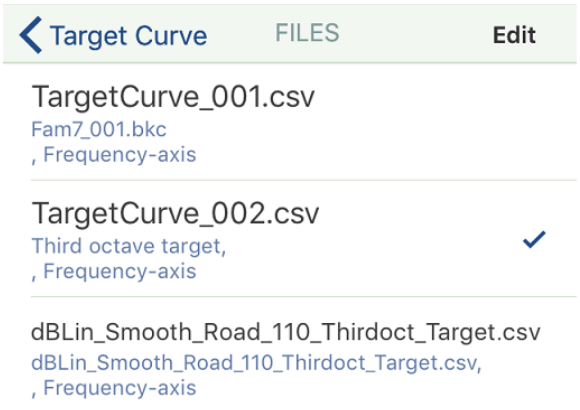
1. Select *Target Curve* from the list of available files. Only those which are compatible with the current display are shown in the list, for example, only Spectrum target curves are listed in this example:

2. Optionally, you can select a tolerance band, which in the following example has been set to +5 dB (dark grey) and -5 dB (light grey):

3. If you use the cursor in Target mode, a real-time Δ cursor value is displayed, which shows the difference between the measured and (upper) target curves:

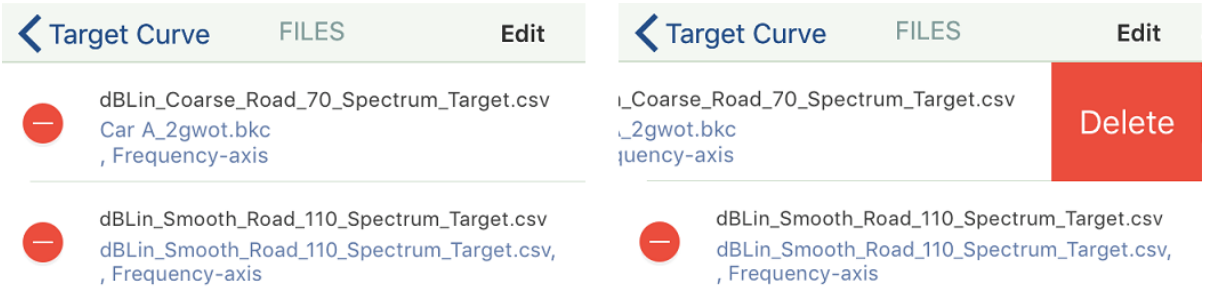
Deleting Target Curves

1. From the Settings menu, select *Target Curve*, then tap the filename to display the currently available list of compatible target curves:



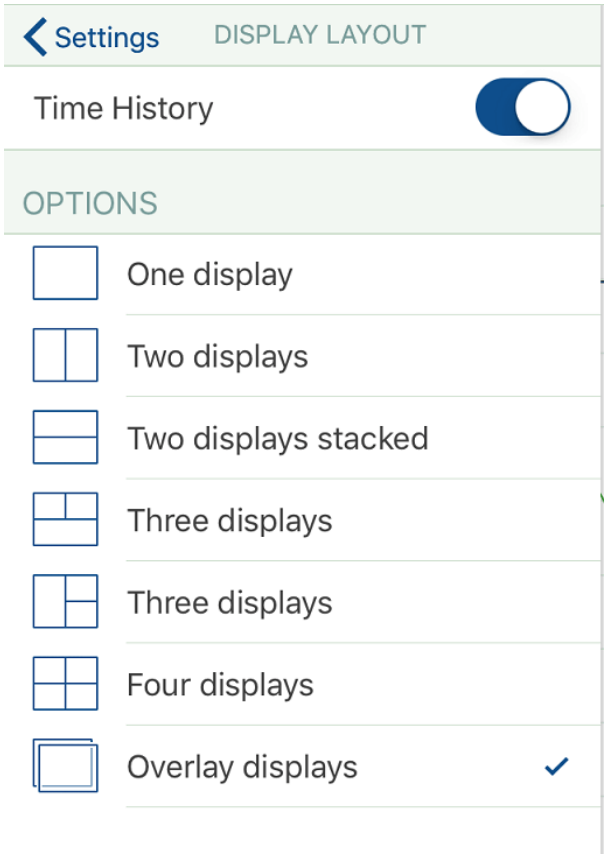
2. Tap the Edit button, see above.

3. Tap the red activate button next to the file you want to delete, then tap on the red *Delete* button that appears to delete the target curve:



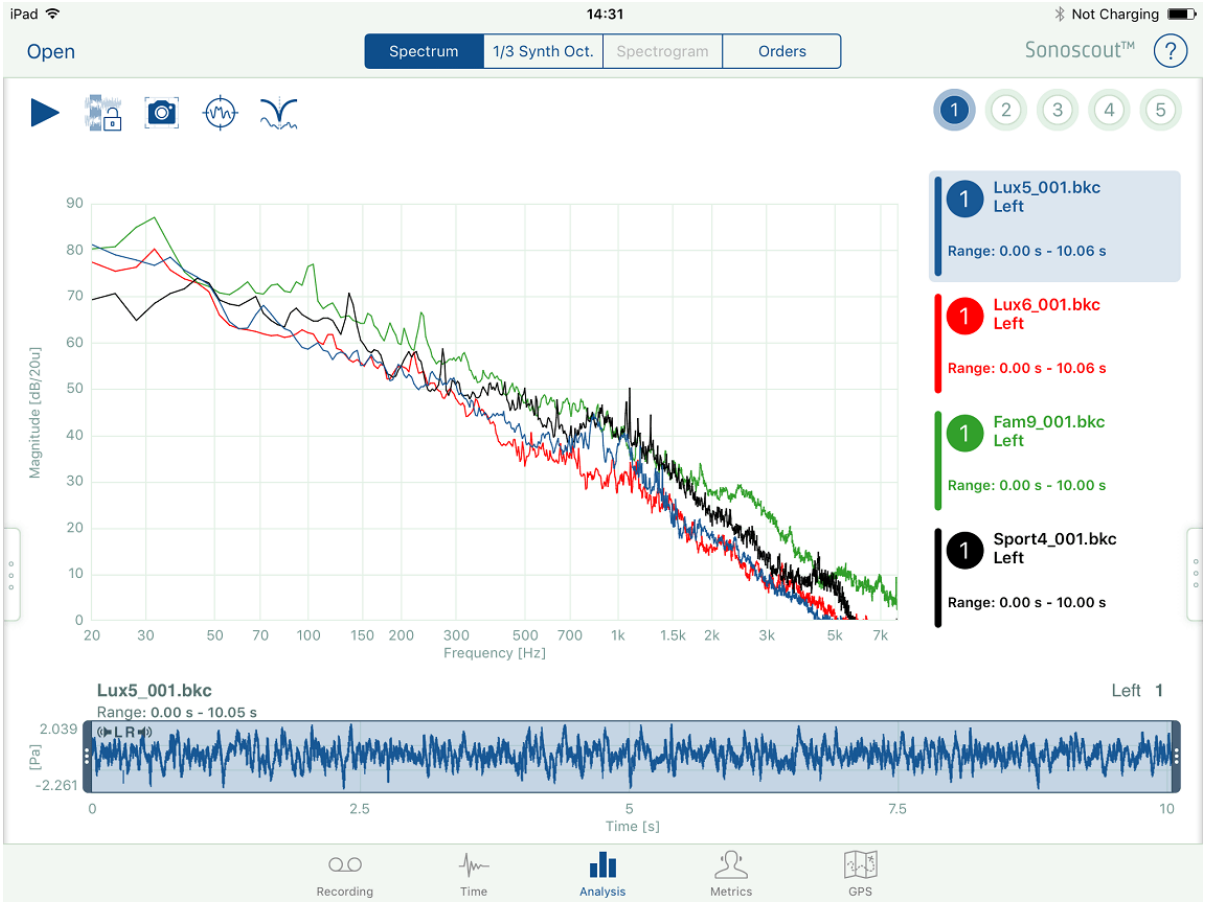
Overlay Display - Spectrum

1. Select *Overlay displays* from the from the list of available types:



   'Overlay displays' works exactly the same as 'Four displays', for example, you can overlay up to four channels from one file, or up to four channels from four different files.

2. The filename, channel name and channel number line-style details are shown in the legend box. If you tap the legend box it defines the active curve, that is, the one to which the current settings apply.



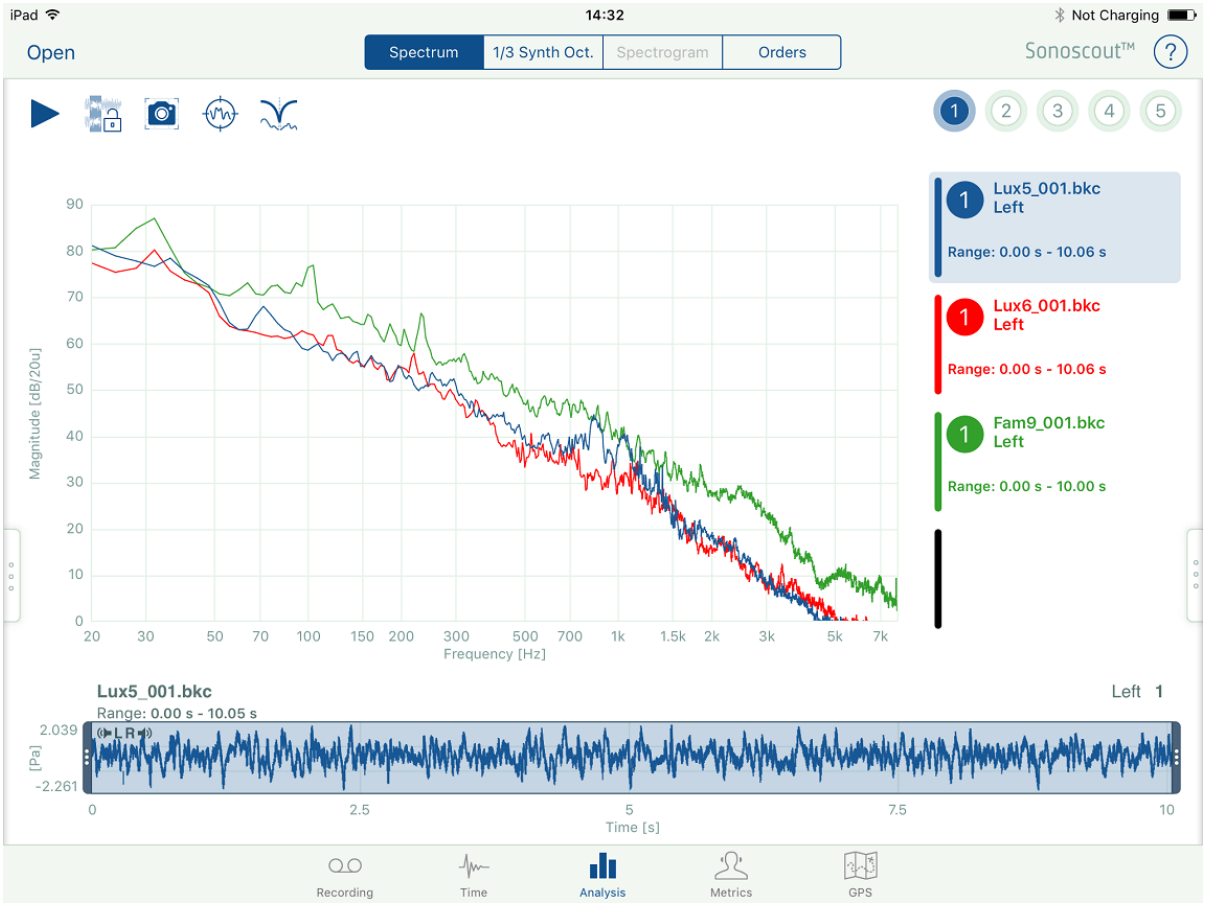
The time history display is also for the selected curve and this is what you will hear (and see) as a real-time spectrum, if you touch the play button.

The channel button colour matches the line colour.

The legend box also shows the time history range used in the spectrum calculation and the cursored magnitude value. The cross-hair is positioned on the highlighted curve and the Frequency and Magnitude of the cursor are displayed at the top left of the graph.

3. To clear a curve, touch and hold on the legend box and a *Clear* button will appear. If you tap *Clear* the selected curve will be removed:

Display after removal:



Note: there is no Clear option for the blue curve.

Range Synchronisation

If the **Range Synchronisation** button is off, each display can have a different range. If the button is on, each display from the same file as the active display has the range defined by the active display.

Note: This range is not applied to any other files which are currently open.

Screenshot, Target Curve and Filtering

In Overlay displays these controls work exactly as in non-overlaid displays, that is, the requested functionality applies to the currently selected curve:

Display Settings

Overlay displays have their own Display Settings which are completely independent of the settings used in non-overlaid displays.

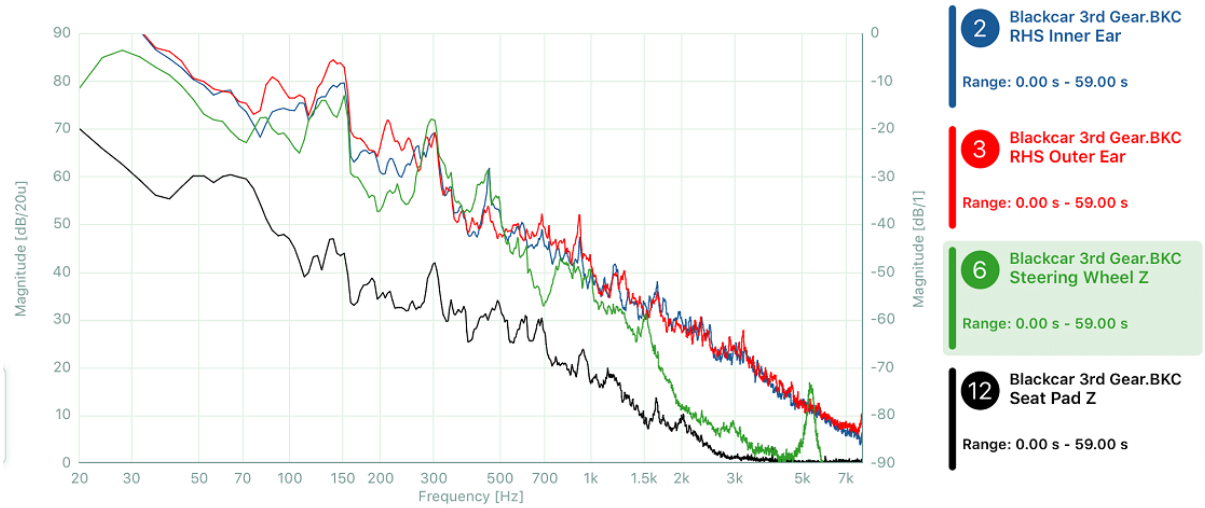
Multi Y-axis

If channels with different units (for example, sound pressure and acceleration) are compared, the graph has two y-axes. If any of the selected channels are sound pressure their magnitude scale will be on the left Y-axis, whilst the right Y-axis will have units of vibration.

Each axis has its own Display Settings.

If you double-tap in the display window, both y-axes are restored to the Display Settings.

The y-axis is activated by touching the legend box of a channel which uses it. You can tell it is active because the vertical axis has a black line. The graph grid lines apply to the active y-axis:



You can use multi-touch to zoom or move the curves which use the currently active y-axis. If you double-tap outside the display, but near the y-axis, the currently active curves will be auto-scaled.

Overlay Display - 1/3-oct. Synthesized

The functionality for 1/3-octave Overlay Displays is essentially the same as for the Spectrum, but with one additional option.

In Display Settings you can choose to display the data as unfilled **bars**:

....or **wire**:

iPad
14:44
70%
Open
Spectrum
1/3 Synth Oct.
Spectrogram
Orders
Sonoscout™
Displ...ttings
GRAPH STYLE
Bar
Wire
1
2
3
4
5
Lux5_001.bkc
Left
Range: 0.00 s - 10.06 s
Lux6_001.bkc
Left
Range: 0.00 s - 10.06 s
Fam9_001.bkc
Left
Range: 0.00 s - 10.00 s
Sport4_001.bkc
Left
Range: 0.00 s - 10.00 s
315
1k
3.15k
10.0k
Frequency [Hz]
Left 1
5
7.5
10
Time [s]
Recording
Time
Analysis
Metrics
GPS

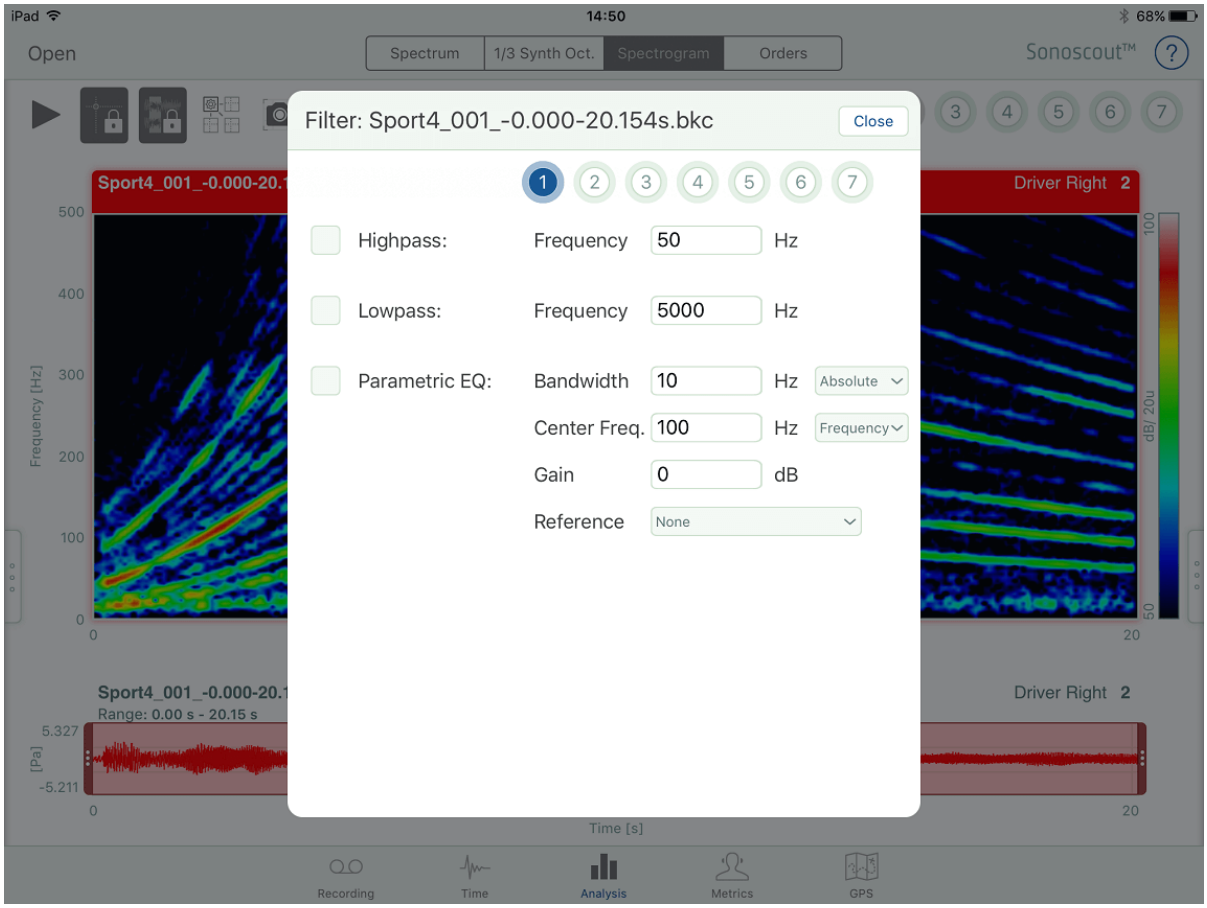
Overlay Display - Orders

The functionality for Order Overlay Displays is essentially the same as for the Spectrum, but with options for choosing a reference channel, the type of x-axis (Time, RPM or Speed), an Order number, or the Total Order value:

Filtering

1. Use this button to open the Filter form:

2. Define the filter properties on the form and select the channel(s) to filter:

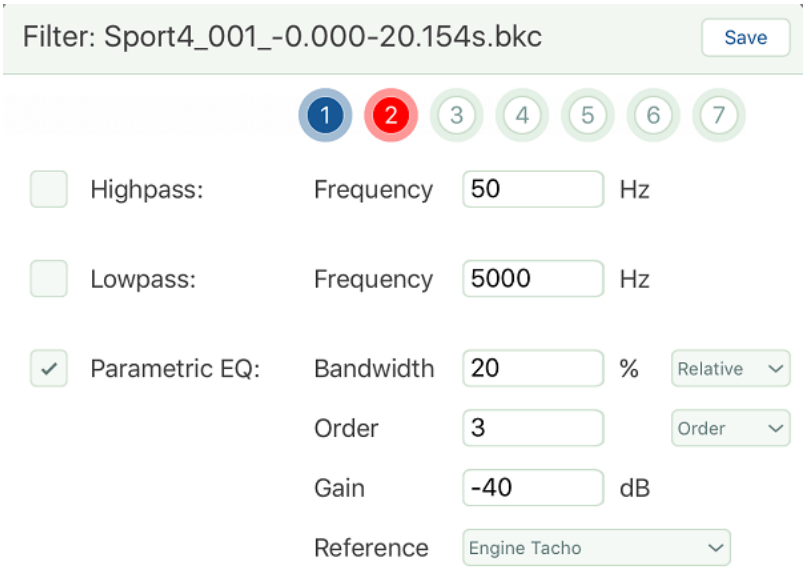


High Pass, Low Pass and Parametric EQ (Notch) filters can be applied simultaneously.

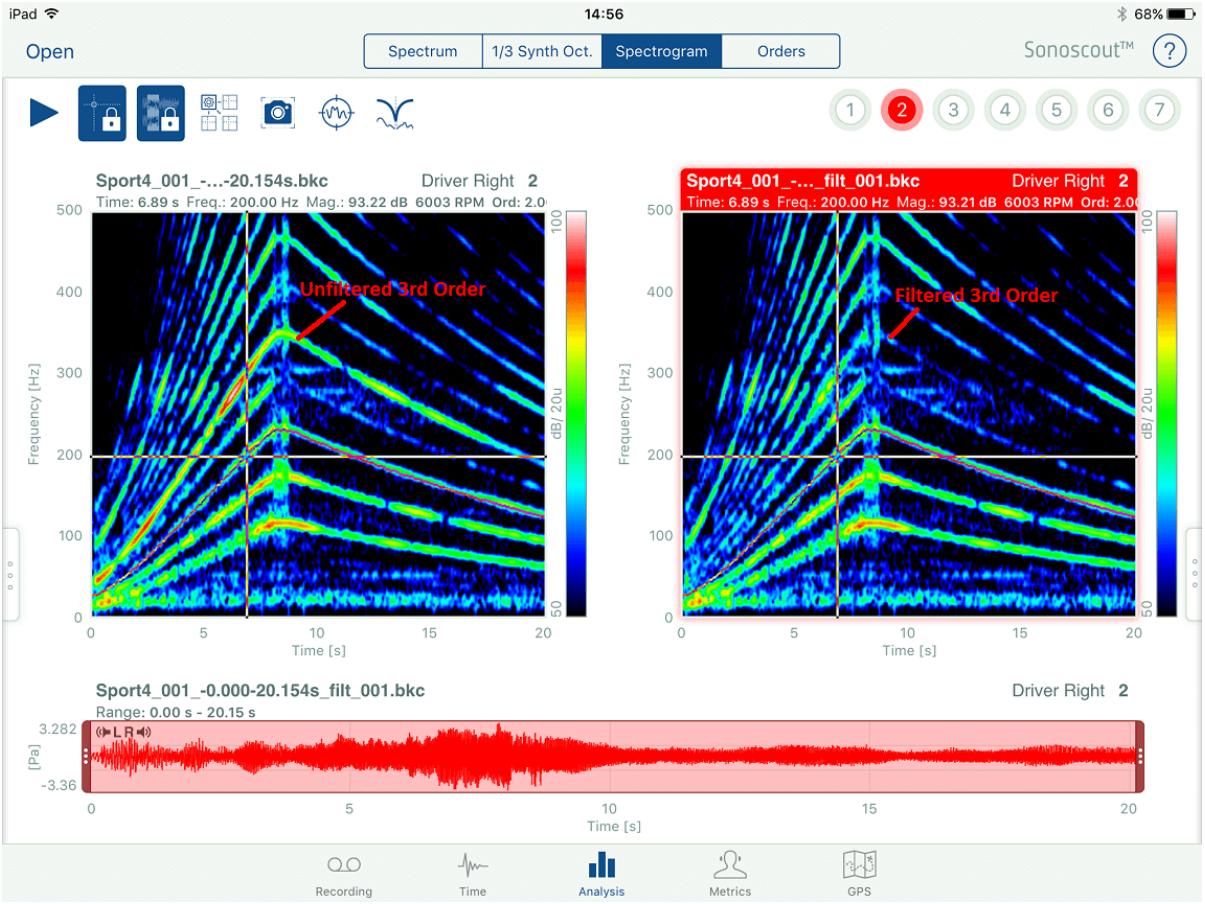
The notch filter can be at a fixed frequency or order-tracked using any of the available Reference channels, i.e., Tachos or Profiles.

Filtering Example

1. In this example, an engine order-tracked filter is applied to 3rd engine order:



2. Using a 2-display layout the unfiltered and filtered sounds can be displayed side-by-side for comparison. In this example, the large reduction in the 3rd order can clearly be seen:



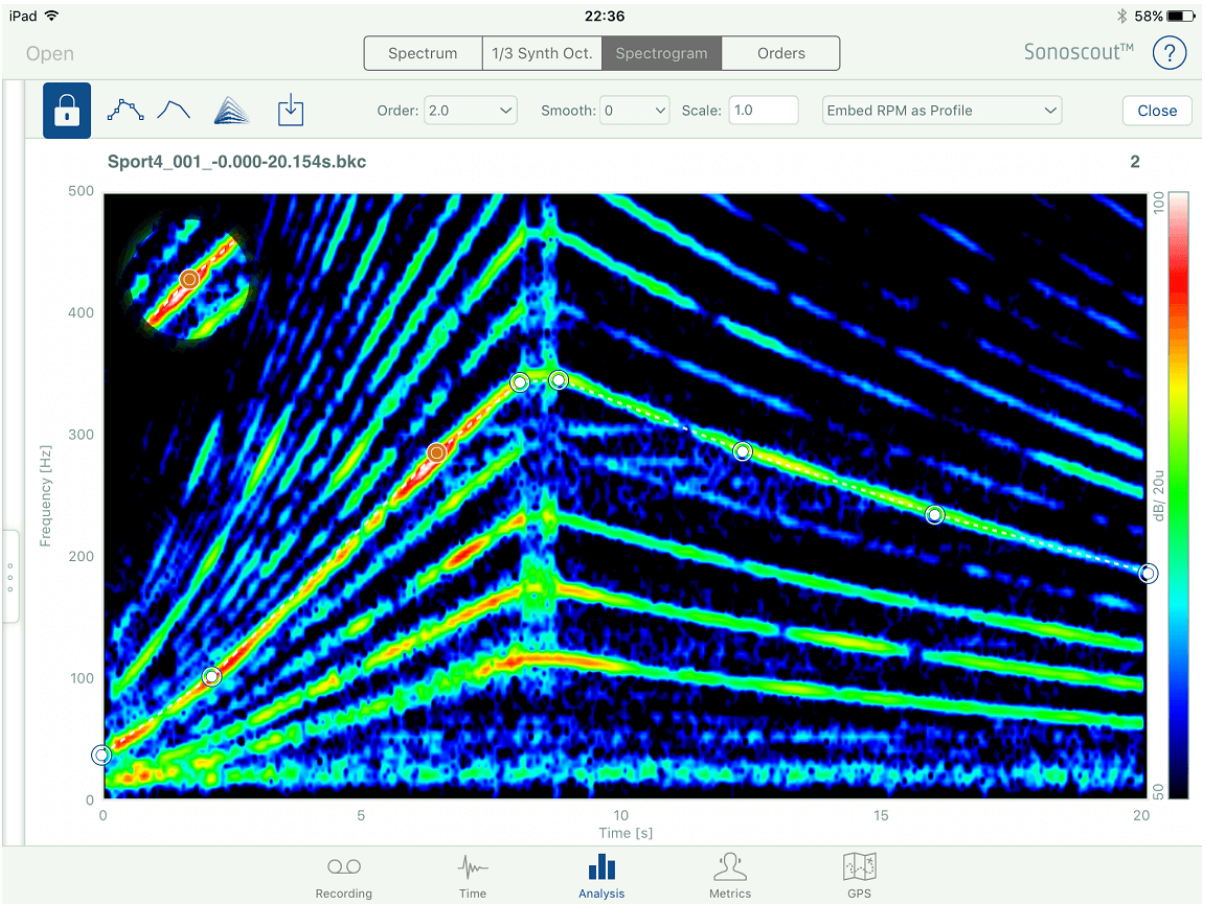
3. To listen to the effect of the filtering, tap ▶ and activate the left or right display to hear unfiltered or filtered sound for any channel.

   When switching between them, the sounds play:
   - From the current time if the files are the same length
   - From the beginning if the files are different lengths, or if you stop/start the play

RPM Finder

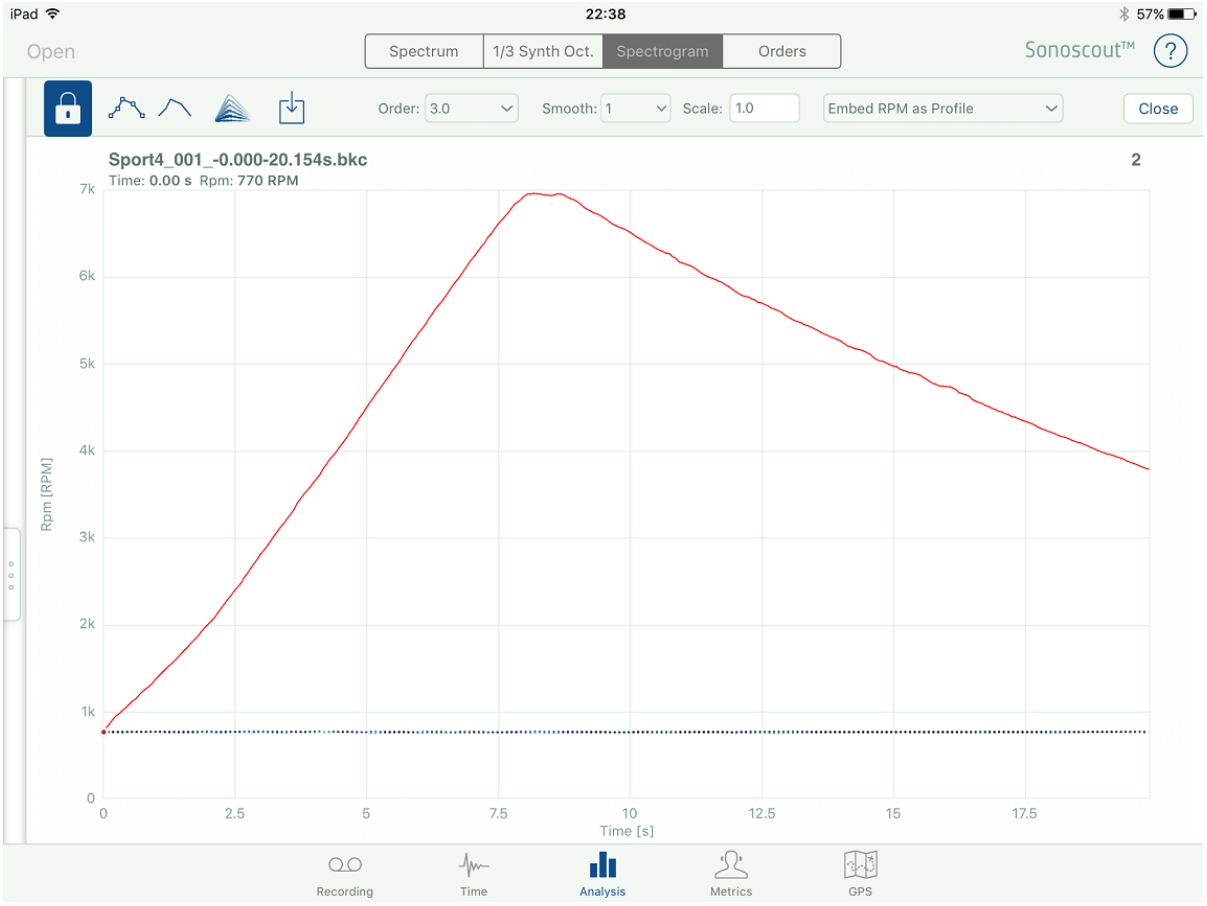
1. To open the RPM Finder GUI, switch to the Analysis task and swipe from the right side of the display.

2. Tap an order on the Spectrogram display, then tap to place and adjust the 'grippers':

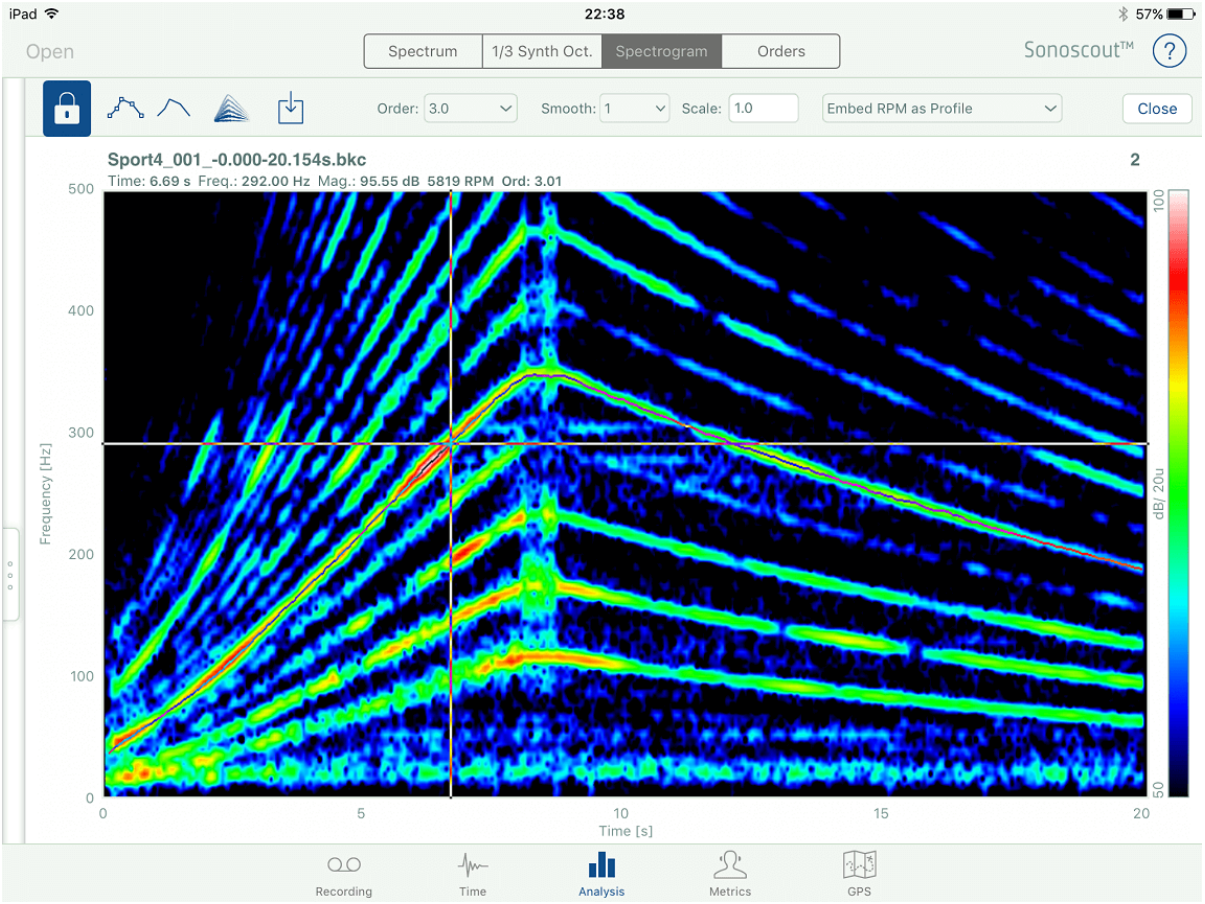


Specify the order number you think it is.

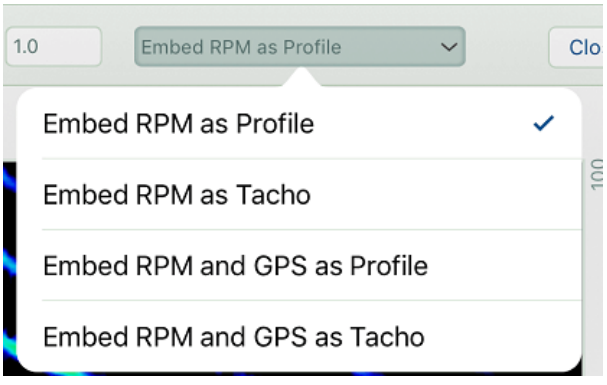
3. Check the calculated profile, tap and adjust smoothing as necessary:



4. Tap and check the final profile using cursors on the Spectrogram:

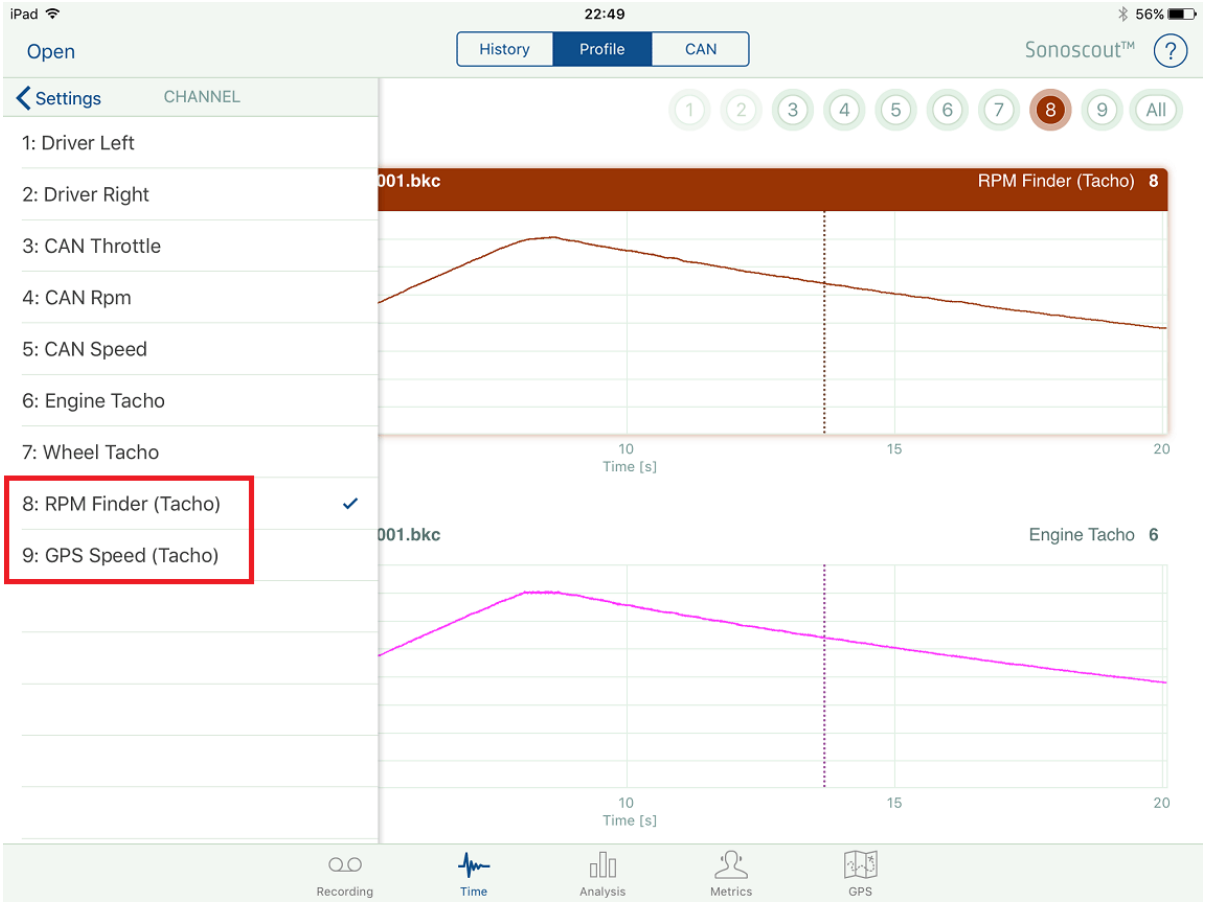


5. From the drop-down above the display you can now select how to embed the RPM (and optionally the GPS) into the profile:



Once selected, tap on to embed it.

6. One (or two) new profile channels will be added to the original file:



7. When *Embed RPM as Tacho* is selected:
   - The engine RPM is a 1 pulse per revolution tacho pulse
   - The vehicle speed is a 9 pulses per metre tacho pulse

8. Lock: If you wish to zoom the Spectrogram in/out using multi-touch, first tap the Lock button to unlock the display, then tap it again to lock it after you have finished.

   Once it is locked you can place/adjust grippers without unintentionally rescaling the map.

9. Scale:
   - The algorithm is optimized for sounds where the strongest harmonics are in the range order 2 to order 8 inclusive

- Choosing the best parameters:
    - If you place the grippers on any order up to and including 8, then set Order to the order number you are tracking and set Scale to 1
    - If you place the gripper on an order greater than 8, then set Order to 1 and Scale to the order number you are tracking, for example, 32
    - If you want to track non-integer orders then set Order to 1 and Scale to the order number you are tracking, for example, 2.83

10. Once you have finished the task, tap *Close* to hide RPM Finder and restore the previous Analysis display.

File Management

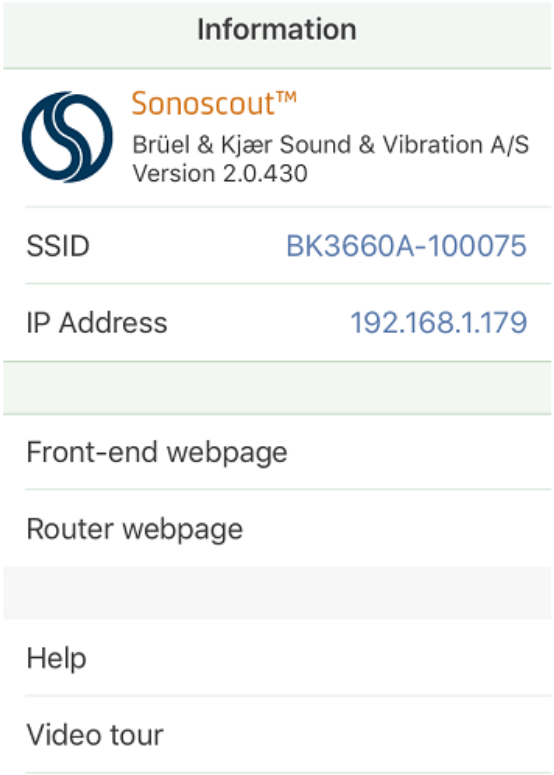
There are various methods for copying files to/from your mobile device and to/from your PC, as well as options for deleting them, these are described below.

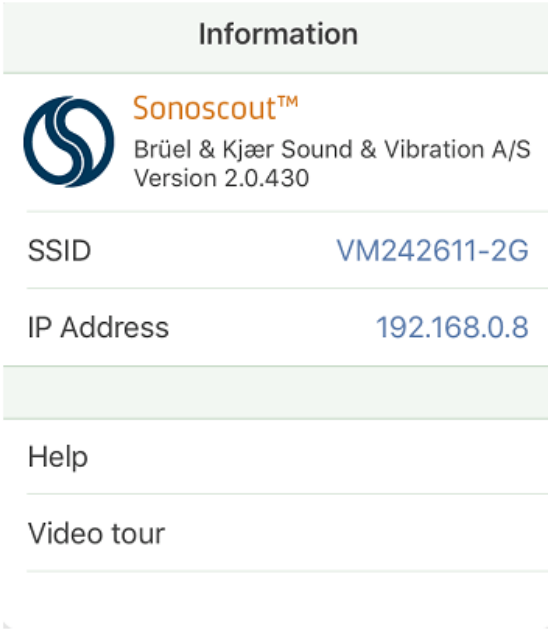
Copying Files From your Mobile Device to Your PC

The preferred method for transferring files is to use the Sonoscout web page, as it does not require iTunes® to be running, or even installed on your PC. You can use any web browser on your PC to download files from the mobile device, but Google Chrome™ is recommended, since it supports download of several files in one click.

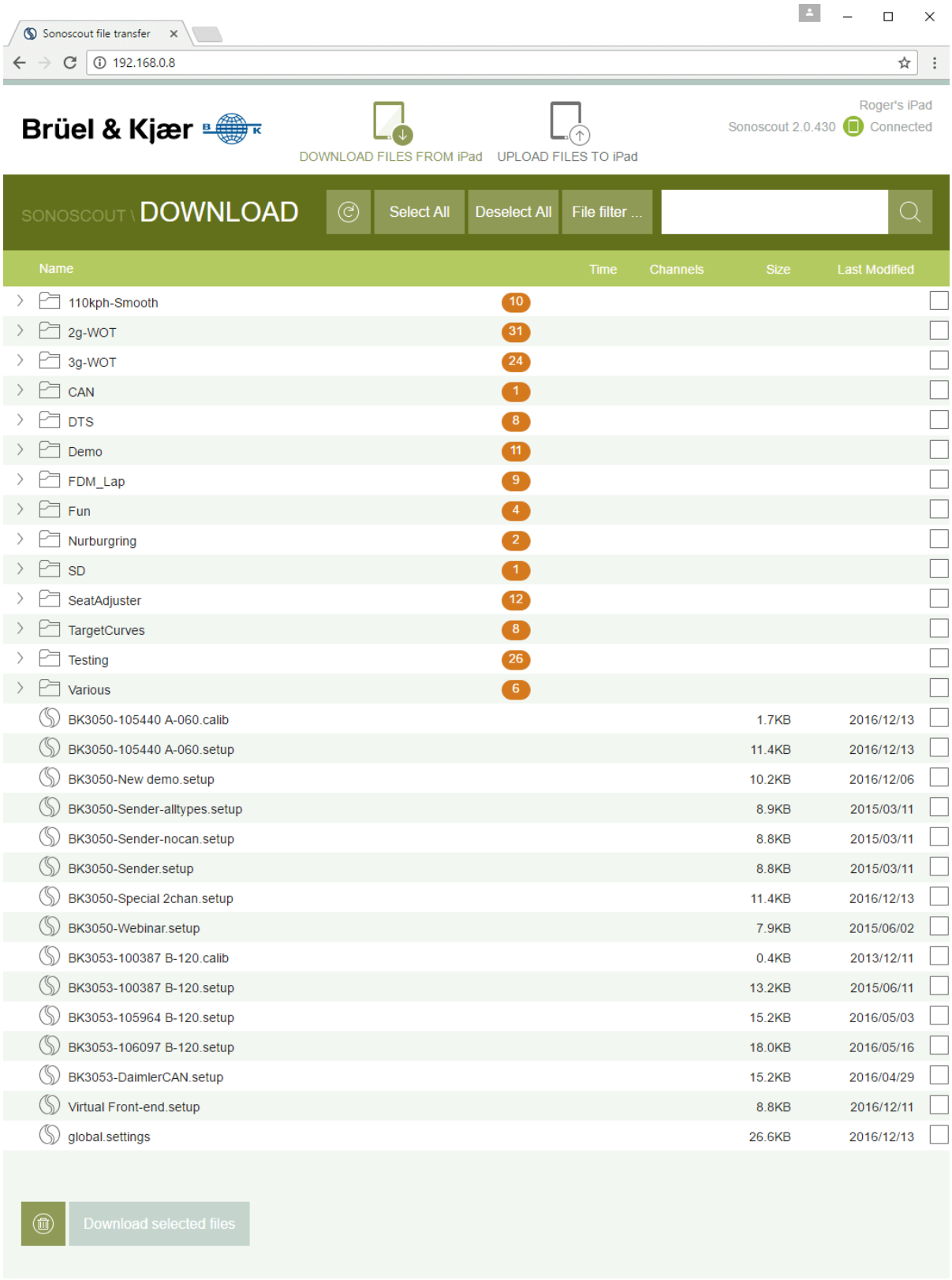
The procedure for using the Sonoscout web page is as follows:

1. Connect the mobile device and your PC to the same router (this could be the Asus Wireless Router in the LAN-XI Module).
2. Make sure that Sonoscout is running on the mobile device.
3. In your browser, enter the IP Address of your mobile device.
   Tap '?' to open the Information (About) Pop-up and read the IP Address from there:



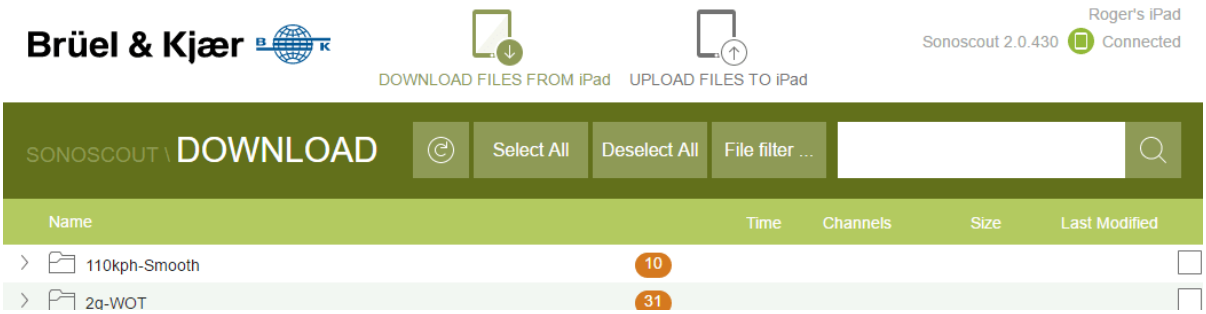


The Sonoscout web page appears:


Sonoscout file transfer
192.168.0.8
Brüel & Kjær
DOWNLOAD FILES FROM iPad
UPLOAD FILES TO iPad
Roger's iPad
Sonoscout 2.0.430
Connected
SONOSCOUT \ DOWNLOAD
Select All
Deselect All
File filter ...
Name
Time
Channels
Size
Last Modified
110kph-Smooth 10
2g-WOT 31
3g-WOT 24
CAN 1
DTS 8
Demo 11
FDM_Lap 9
Fun 4
Nurburgring 2
SD 1
SeatAdjuster 12
TargetCurves 8
Testing 26
Various 6
BK3050-105440 A-060.calib 1.7KB 2016/12/13
BK3050-105440 A-060.setup 11.4KB 2016/12/13
BK3050-New demo.setup 10.2KB 2016/12/06
BK3050-Sender-alltypes.setup 8.9KB 2015/03/11
BK3050-Sender-nocan.setup 8.8KB 2015/03/11
BK3050-Sender.setup 8.8KB 2015/03/11
BK3050-Special 2chan.setup 11.4KB 2016/12/13
BK3050-Webinar.setup 7.9KB 2015/06/02
BK3053-100387 B-120.calib 0.4KB 2013/12/11
BK3053-100387 B-120.setup 13.2KB 2015/06/11
BK3053-105964 B-120.setup 15.2KB 2016/05/03
BK3053-106097 B-120.setup 18.0KB 2016/05/16
BK3053-DaimlerCAN.setup 15.2KB 2016/04/29
Virtual Front-end.setup 8.8KB 2016/12/11
global.settings 26.6KB 2016/12/13
Download selected files

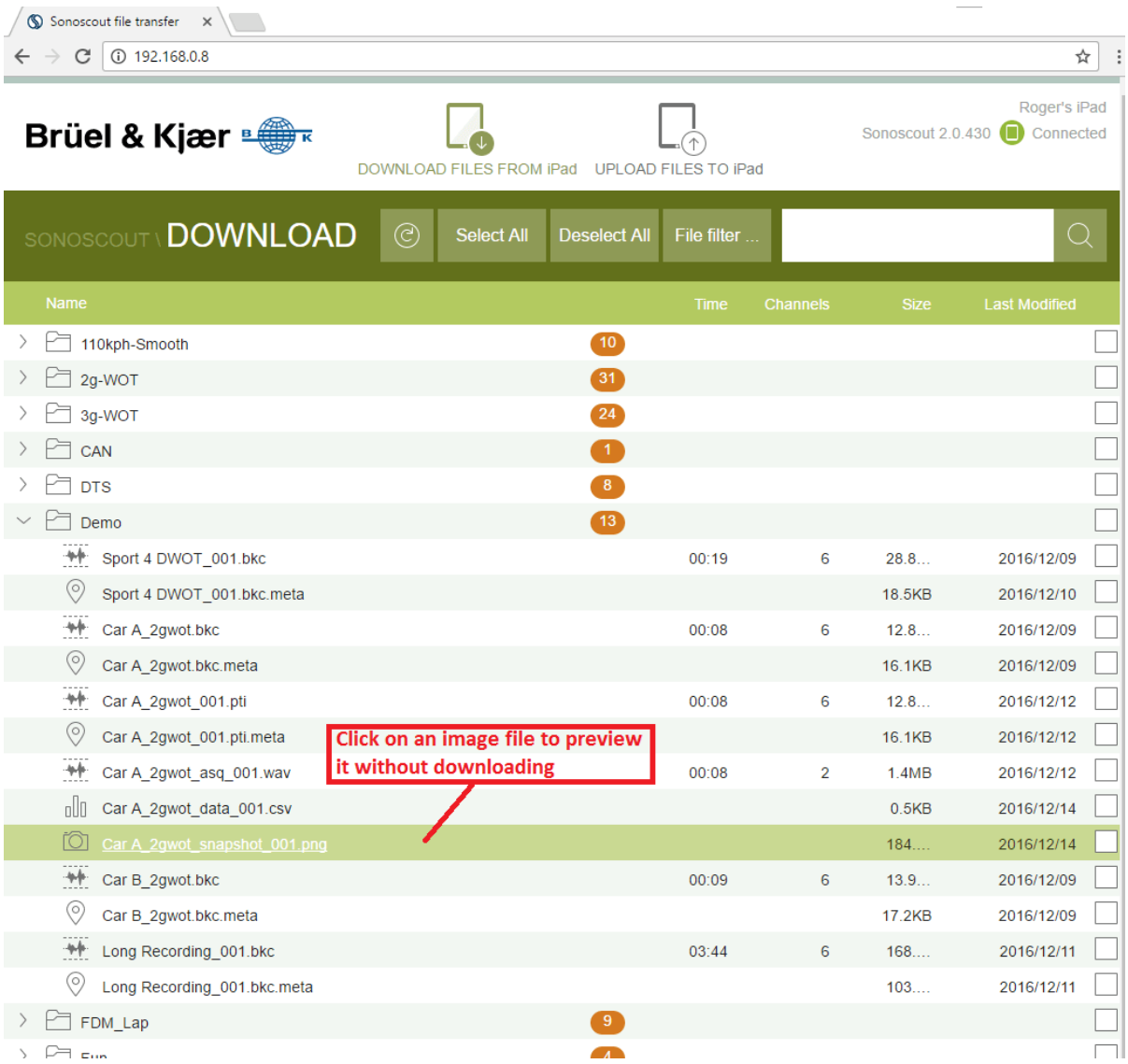
Note: If the web page does not appear, add *:8080* to the IP address.

A search field and extra buttons are provided to help you with file management. These are displayed at the top of the Download screen:

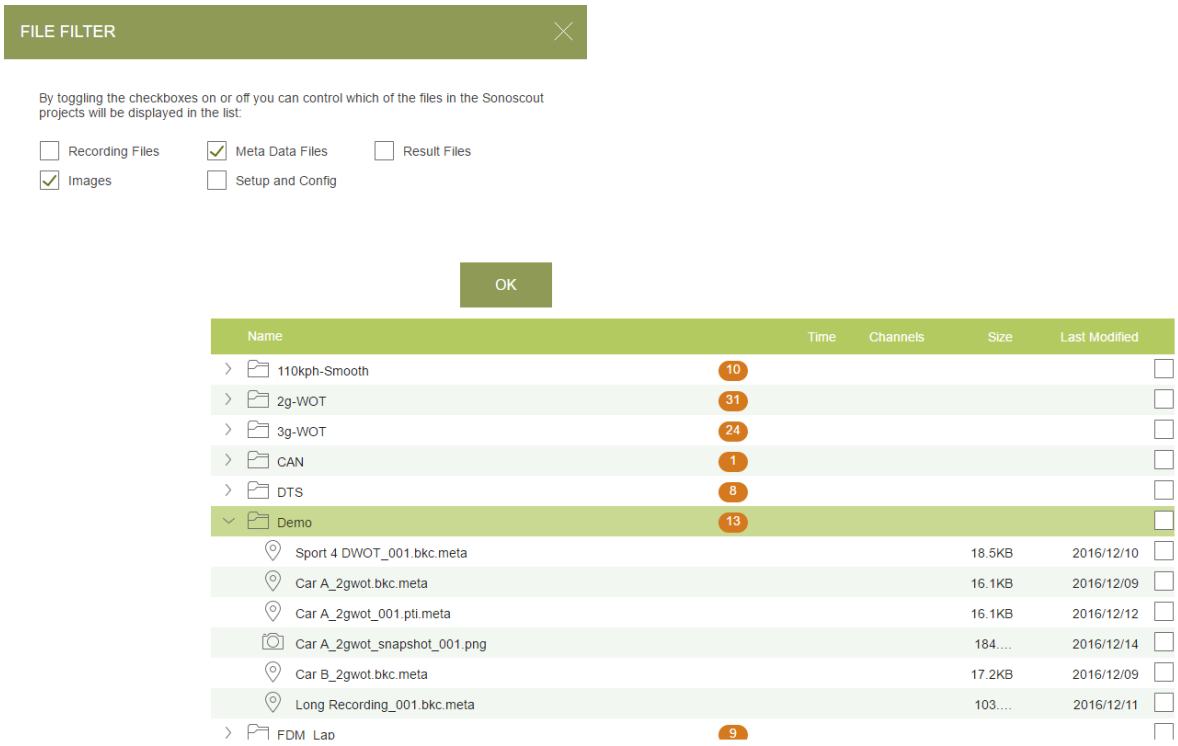


- **Refresh** button - allows you to refresh the display, for example, if you have been using the iPad® during your file management procedure
- **Select All/Deselect All** buttons - these allow you to select or deselect all the files/folders on your mobile device
- **File filter** button - allows you to decide which types of files are shown or hidden in the file/folder list
- Search field - allows you to search in the list of files on your mobile device
- Connected/Disconnected indicator - indicates whether the browser still has connection to the mobile device

4. Expand the folder containing the data you wish to download:

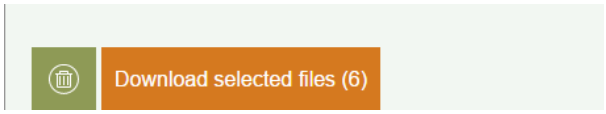


5. Click on **File filter…** to see specific file types:



6. Use the checkboxes to select folder / files to download or delete:

7. Click on the **Download selected files** button and the files/folders are copied to your PC:



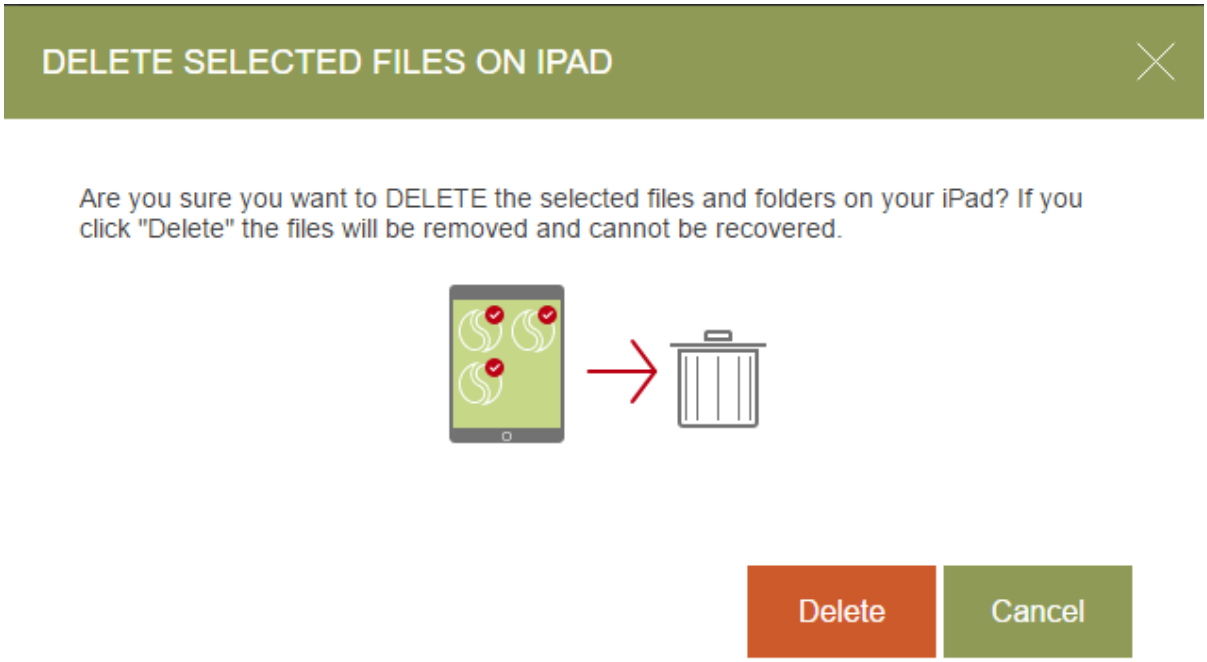
The files are copied to the Downloads folder in your user area on the PC.

Note 1: Depending on your browser, you may need to confirm the download of each file, or you may just need to confirm that you have chosen to download multiple files and the rest will download automatically.

Note 2: Internet Explorer has *Save* or *Save As* options. The *Save* option automatically saves the files to the *User Account/Download* folder on your PC, the *Save As* option allows you to change the download directory.

Deleting Files from Your Mobile Device

1. Choose the folder, and/or files, that you want to delete by checking the relevant checkboxes on the right.
2. Click the Delete button to delete the selected files:

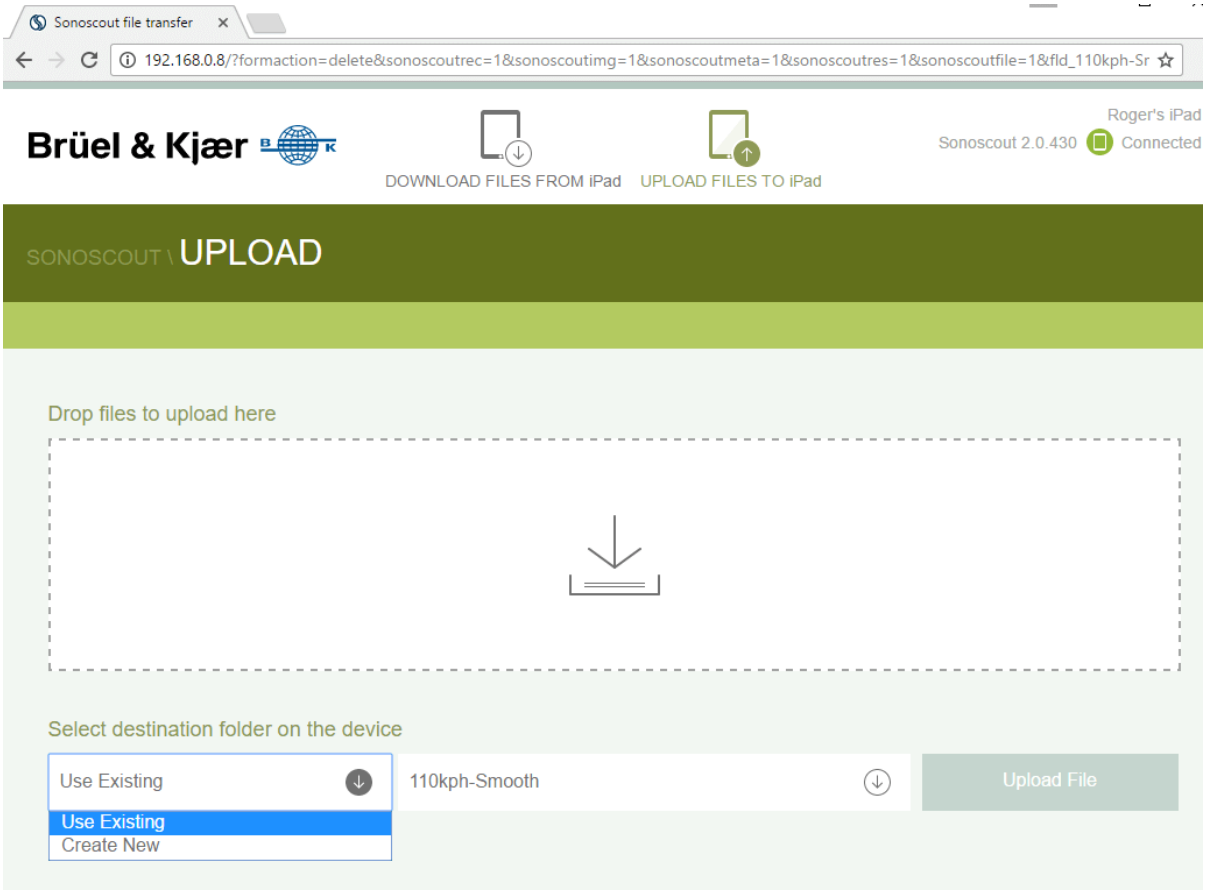


You need to confirm file deletion in a pop-up that appears.

Copying Files From Your PC to Your Mobile Device (Method 1)

You can use the Sonoscout web page to upload files from your PC, the procedure is as follows:

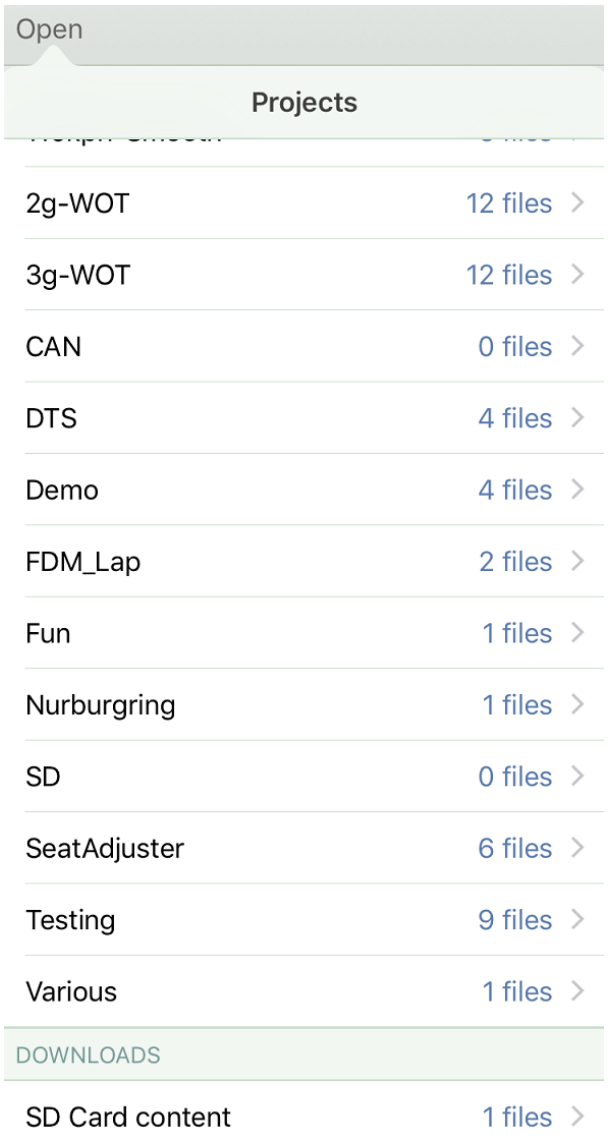
1. First make sure that Sonoscout is running on the mobile device.
2. Then, in your browser, enter the IP Address of your mobile device.
   Note: If the web page does not appear, add *:8080* to the IP address.
3. Select the file you wish to upload to the mobile device by clicking the **Choose File** button:



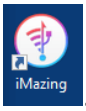
Note: You can only upload one file at a time.

4. Specify an existing or new destination (Project) folder (see above).
5. Click on the **Upload File** button to transfer the file.

6. On the mobile device, the file you have uploaded will appear in the target/selected/specified folder:

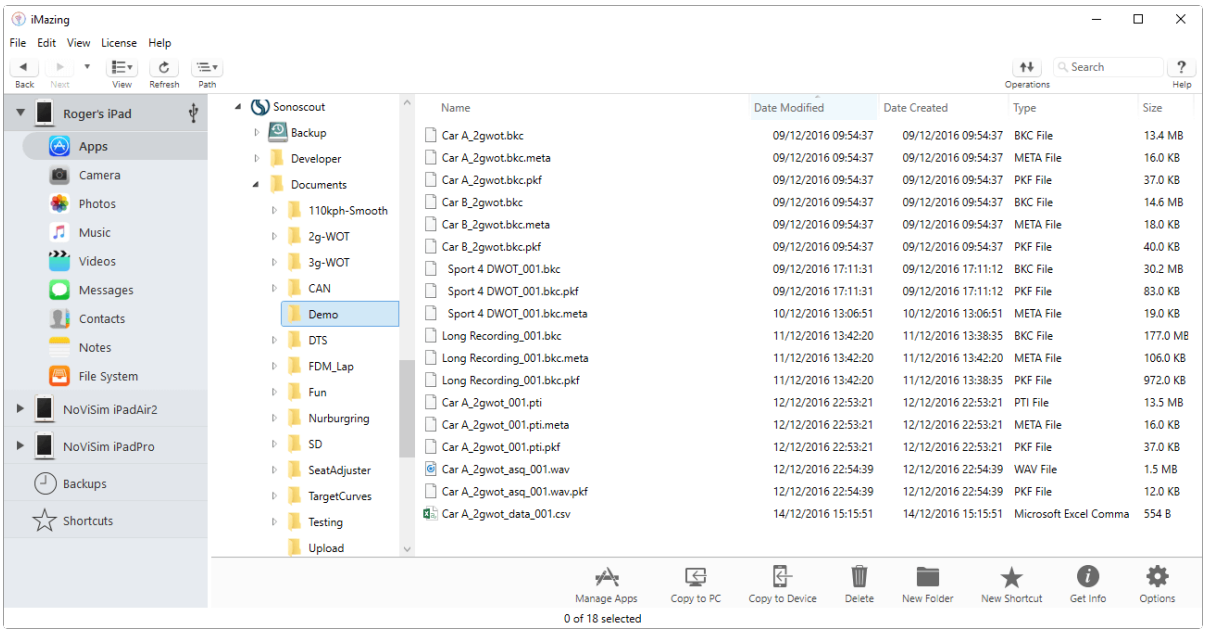


Copying Files From Your PC to Your Mobile Device (Method 2)

1. Install DiskAid on your PC (download it from http://www.digidna.net/).
2. Connect the mobile device to your PC using the USB connector cable.
3. Start DiskAid 

.

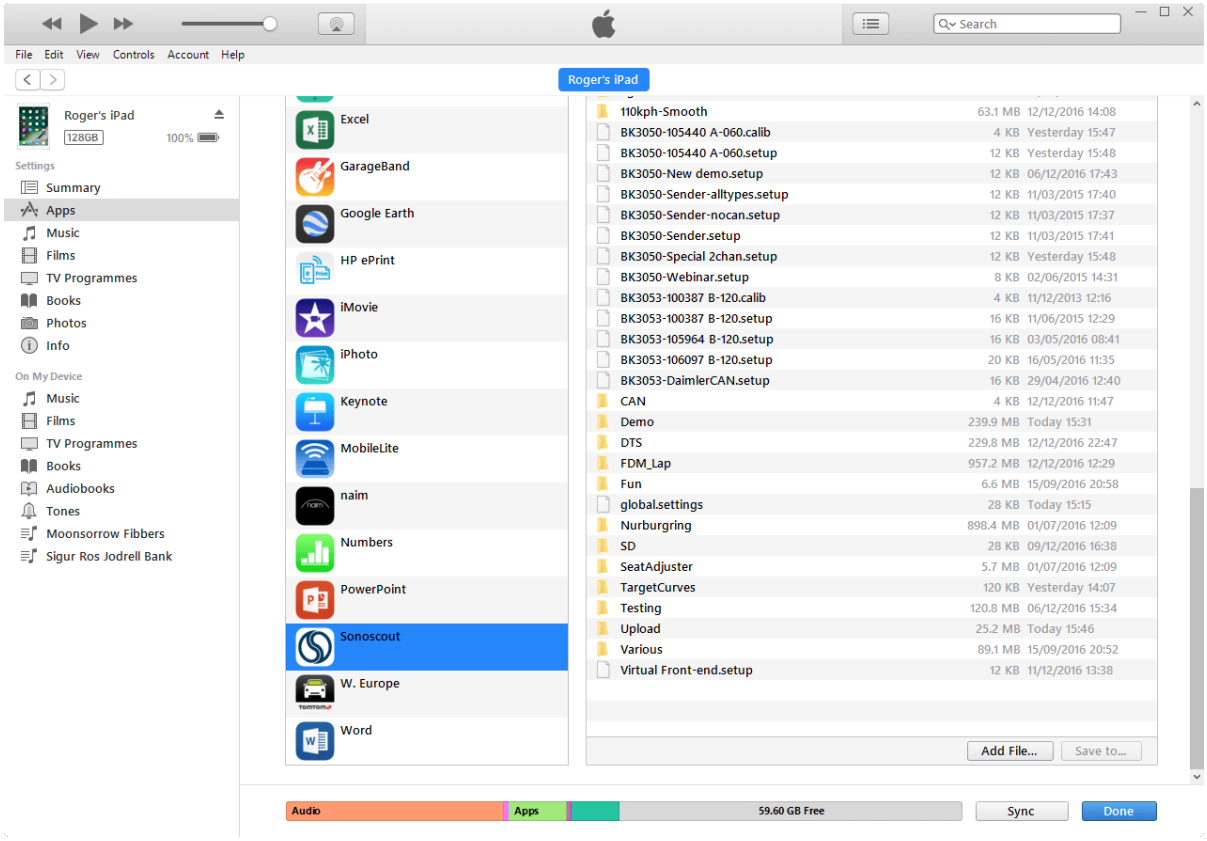
4. Select the Sonoscout App:



5. Select the folder on your mobile device. (You can also make new folders here.)
6. The list on the right shows the files in that folder on the mobile device. You can drag and drop files **to and from** the PC, or delete them in this window (or alternatively, use the icons at the top of the window).

Using iTunes® to Copy Files (Method 1)

1. In iTunes®, select the connected mobile device and display the Apps:



2. Use the **Add** button to copy files from your mobile device to your PC.
3. Use the **Save to..** button to copy files from your PC to your mobile device.

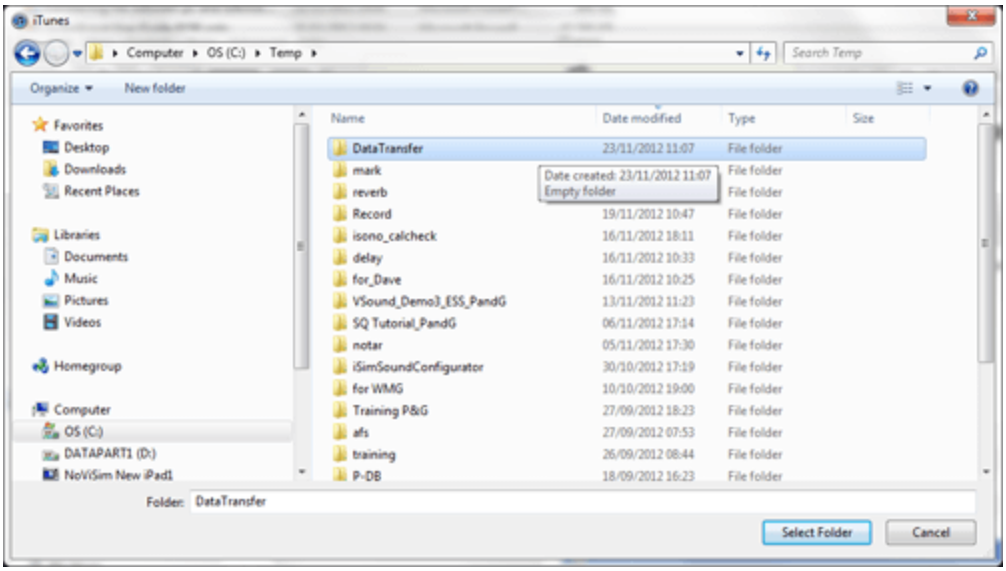
Using iTunes® to Copy Files to Your PC (Method 2)

This method has some restrictions, see the note that follows for details.

1. In iTunes®, select the connected mobile device and display the Apps (see previous figure).
2. Select the folder to copy (under *Sonoscout Documents*).

   Note: You cannot open the folder and copy individual files from it.

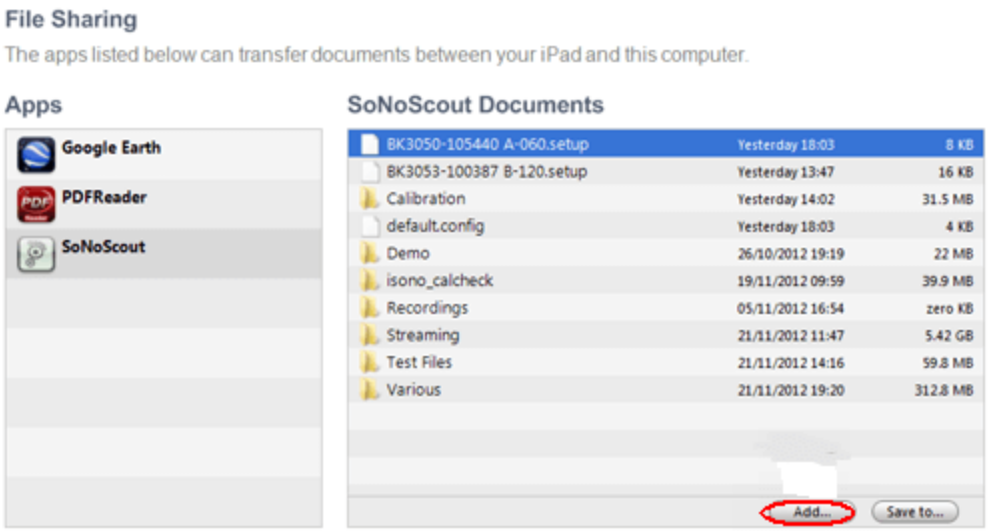
3. Click the **Save to..** button.
4. Select an existing file on the PC where the folder should go:



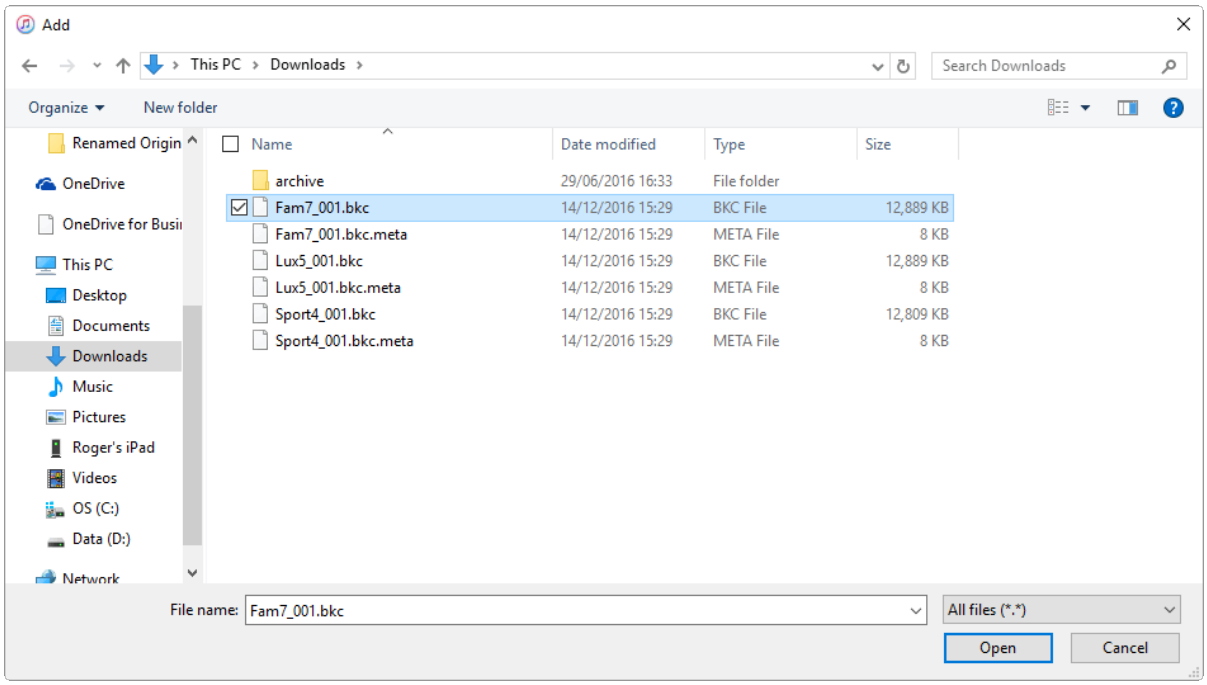
Using iTunes® to Copy Files From Your PC (Method 3)

This method has some restrictions, see the notes that follow for details.

1. Click the **Add** button:

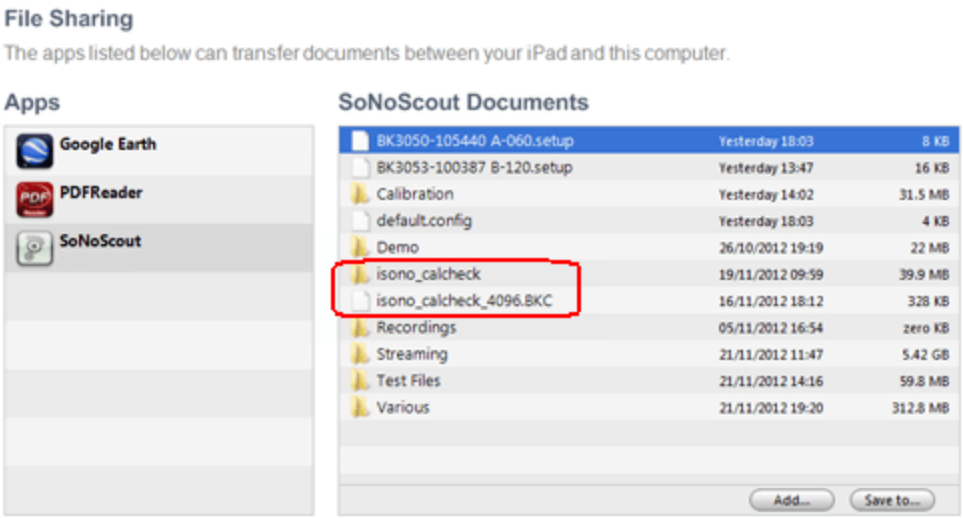


2. Select an existing file on your PC:



Note: You can only copy files, not folders.

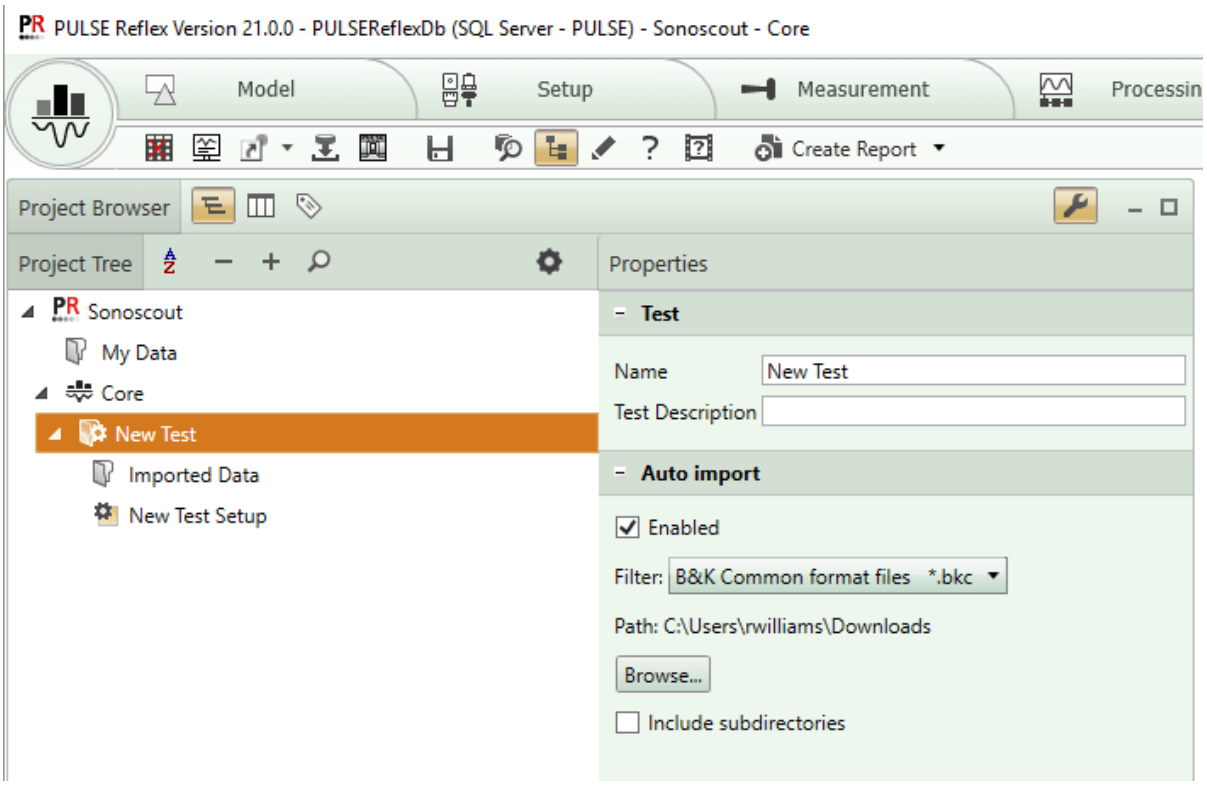
3. The file will be copied to the 'top level'. It is not possible to put the file in an existing folder.



Automatically Opening the Downloaded Files in PULSE™ Reflex

You can set up an Auto-import of your data files into PULSE™ Reflex, where you can further process your data.

1. Select the relevant folder in the Project Tree/Project Browser (where you are going to import the data), then click the Properties icon to access the Auto import parameters:



2. Check the *Enabled* checkbox and select *B&K Common format files *.bkc* from the drop-down.

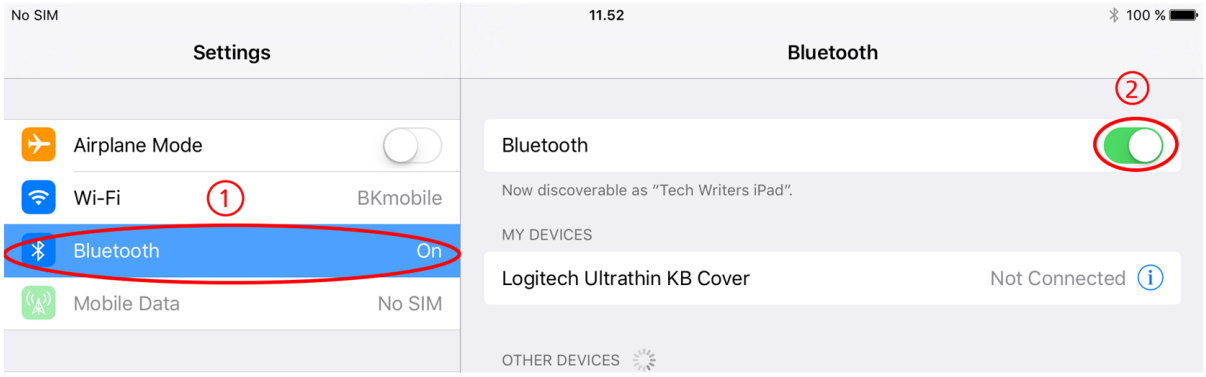
Setting up the Headphones

To be able to use your Brüel & Kjær Binaural Recording Headphones Type 4965, you first need to pair them with your mobile device. Use the following procedure.

Note 1: Before pairing with your mobile device, make sure the battery in the headphones has been fully charged (see the enclosed manufacturer's instructions for charging information).

Note 2: Make sure the headphones are switched off and placed close to the mobile device (approximately 20 cm/ 7 in).

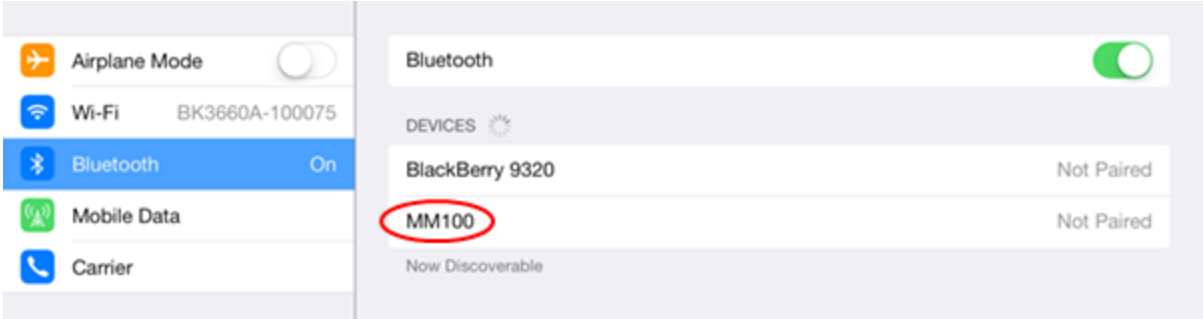
1. On your mobile device, go to *Settings* and select *Bluetooth*:



2. Move the Bluetooth slider to *On*. A list of all the Bluetooth devices that have been discovered will appear.

3. Press and hold the Play/Pause button on your headphones (see figure below) for five seconds. The LED flashes alternately red and blue, indicating that the headphones are in 'pairing mode'.

4. Your mobile device has detected the headphones when *MM100* appears in the Bluetooth Devices list:



5. Tap on *MM100* in the list and enter '0000' in the *PIN* field. Tap on **Pair**.

Connected will be displayed next to *MM100* in the Devices list and the headphones are now ready to use wirelessly:

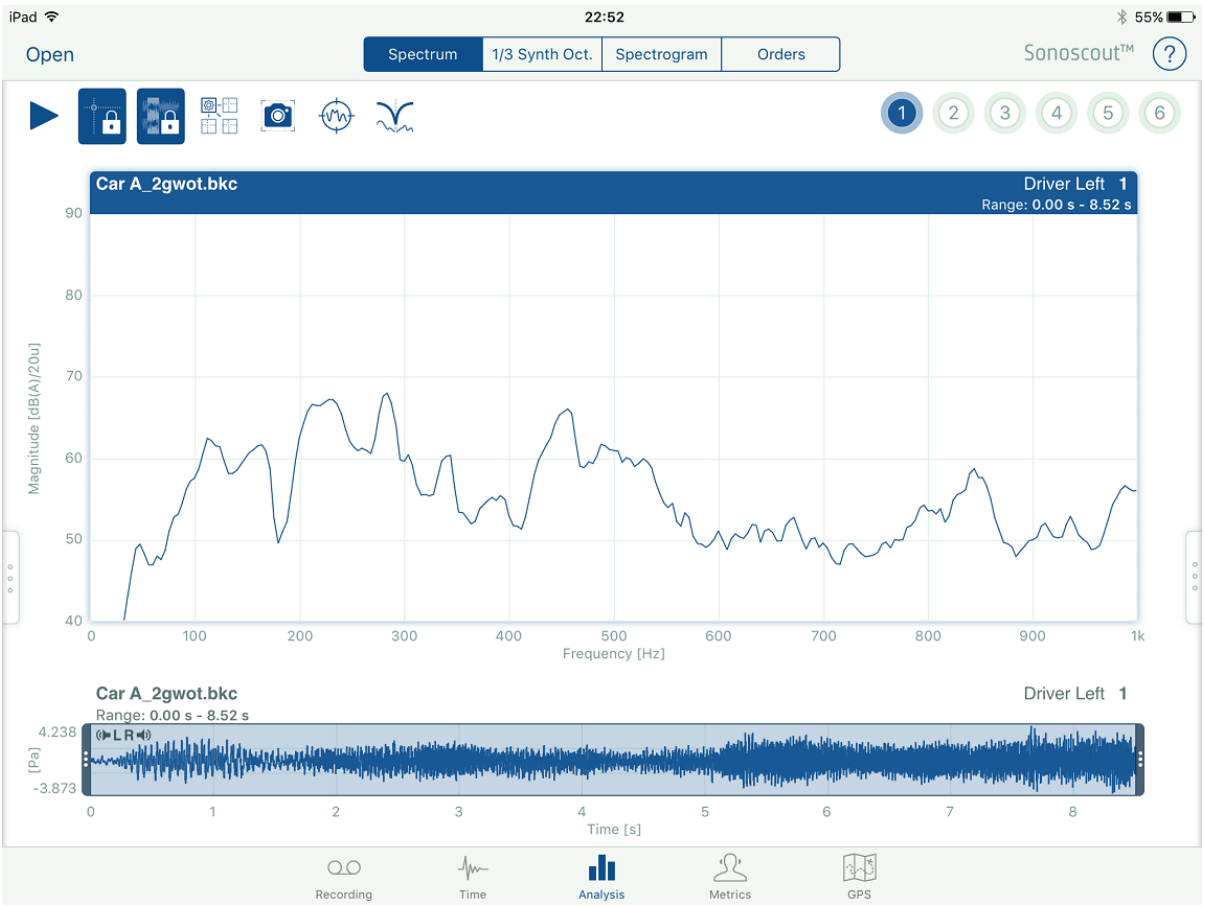
No Service
10:53
Not Charging
Settings
Bluetooth
Airplane Mode
Wi-Fi
BK3660A-100075
Bluetooth
On
Mobile Data
Carrier
Bluetooth
DEVICES
MM100
Connected
Now Discoverable

Time History File Conversion and Export

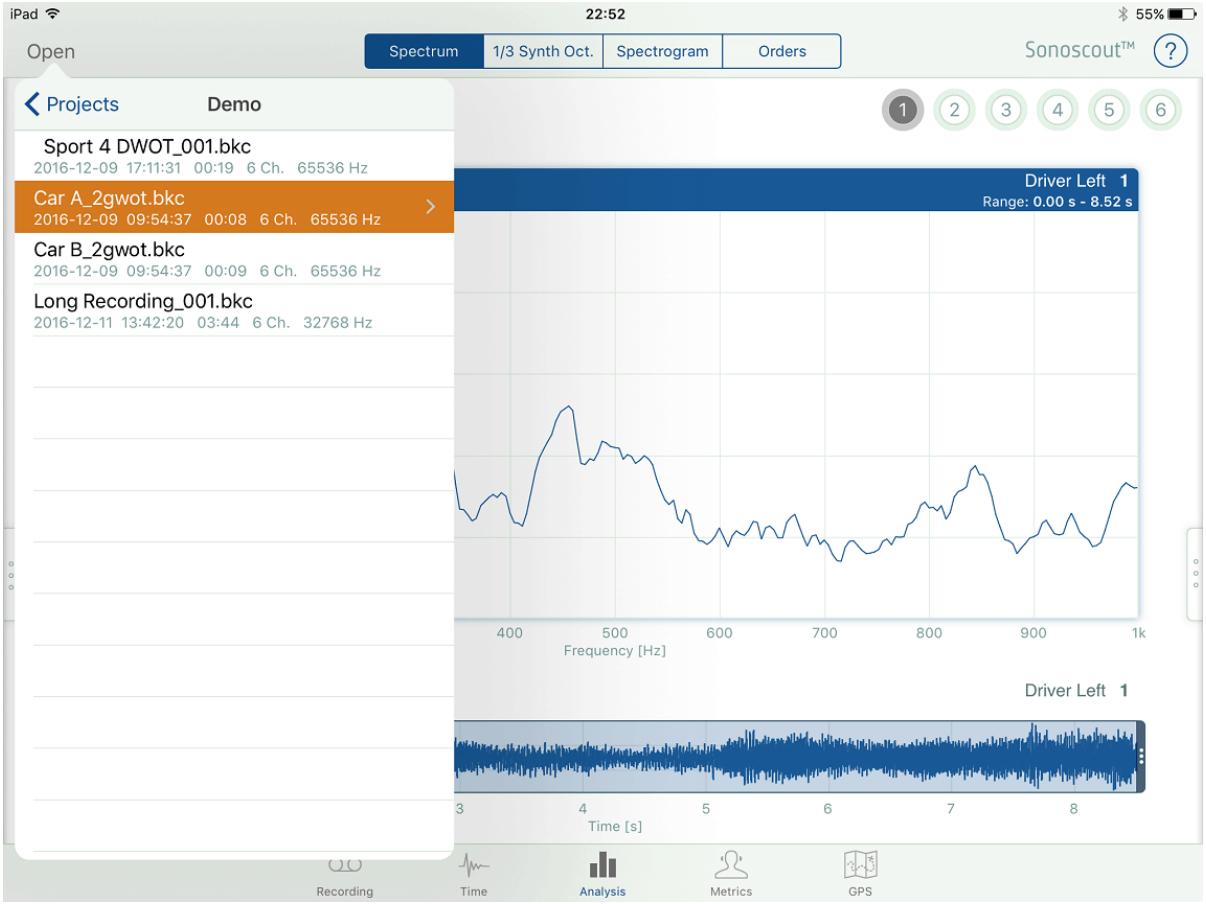
Sonoscout can also convert time history files to different file formats (including SDF) and export time history files to Wav files (including embedded tachos), these are described below.

Converting Time History Files to Different File Formats

1. Open and display the file you wish to convert (Time, Metrics, GPS or Analysis, as in the following example).



2. Select Open again and the currently open file will be highlighted:



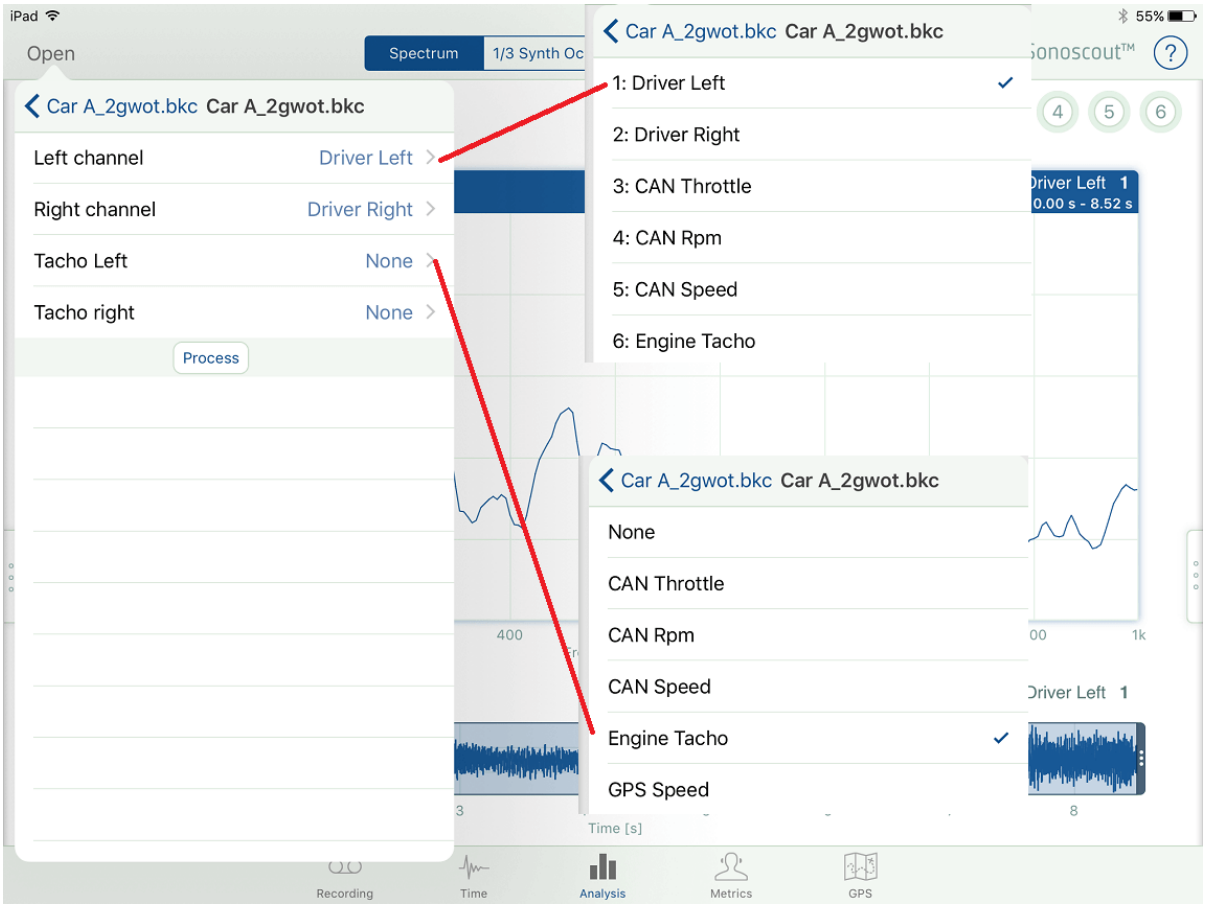
3. Select the highlighted file to open the Convert dialogue and choose the required format:

4. In the following example, *PTI* was selected and a 'PTI version' of the displayed file has been created with the same filename as the original:

Note: If you select *SDF*, the file will be created and can be downloaded via the web page, but it is not shown in the list as it is not supported by Sonoscout (i.e., Sonoscout can create it, but not open it).

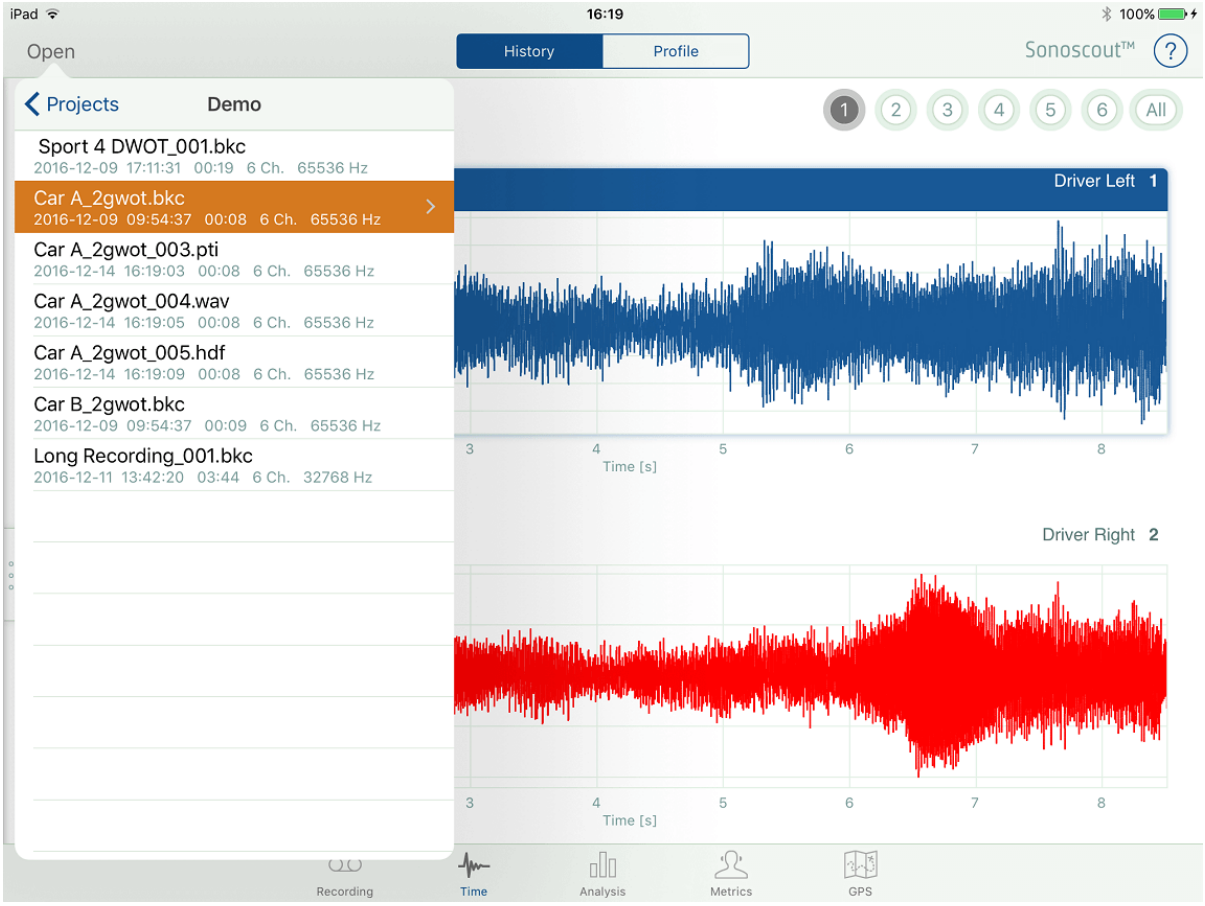
Exporting Time History Files to an ASQ 16-bit Stereo Wav File

1. Steps 1-3 are the same as the previous procedure 'Converting Time History Files to Different File Formats'. However, if you select *Export to ASQ-WAV*, a dialogue opens allowing you to select which two signal channels you want to use, and which two Profile or Tacho channels you want to embed in the 16th bit:



2. If you select a tacho, it is embedded using the recorded ppr and threshold settings. If you select a profile (including GPS) it is converted to a tacho pulse which has the optimum ppr for time resolution and jitter.

3. The file you created has the same name as the original file with an incrementing number added:

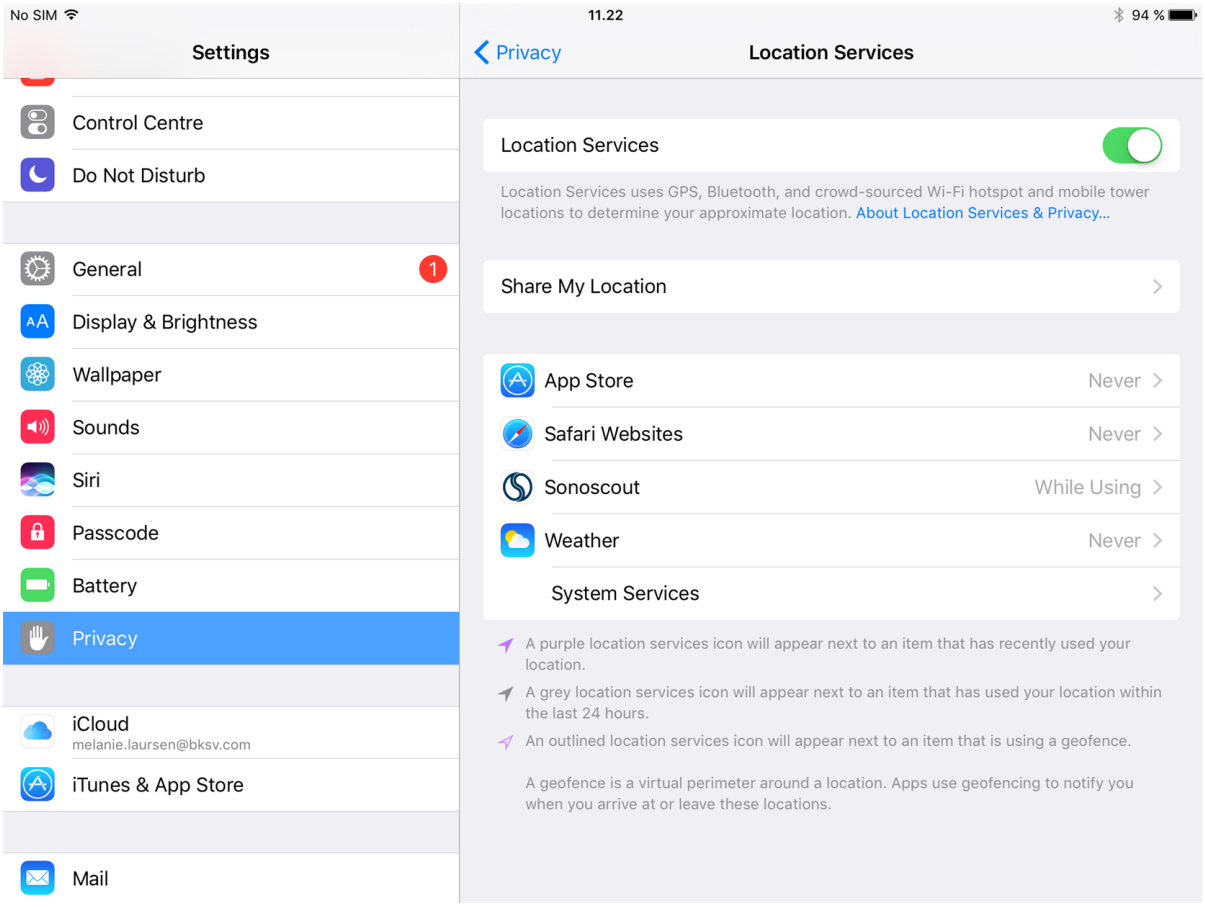

iPad
16:19
100%
Open
History
Profile
Sonoscout™
Projects
Demo
Sport 4 DWOT_001.bkc
2016-12-09 17:11:31 00:19 6 Ch. 65536 Hz
Car A_2gwot.bkc
2016-12-09 09:54:37 00:08 6 Ch. 65536 Hz
Car A_2gwot_003.pti
2016-12-14 16:19:03 00:08 6 Ch. 65536 Hz
Car A_2gwot_004.wav
2016-12-14 16:19:05 00:08 6 Ch. 65536 Hz
Car A_2gwot_005.hdf
2016-12-14 16:19:09 00:08 6 Ch. 65536 Hz
Car B_2gwot.bkc
2016-12-09 09:54:37 00:09 6 Ch. 65536 Hz
Long Recording_001.bkc
2016-12-11 13:42:20 03:44 6 Ch. 32768 Hz
1
2
3
4
5
6
All
Driver Left 1
3
4
5
6
7
8
Time [s]
Driver Right 2
3
4
5
6
7
8
Time [s]
Recording
Time
Analysis
Metrics
GPS

Setting up a GPS

Note: This task requires GPS capability on your mobile device.

1. Ensure you have enabled the GPS by tapping *Settings* on your mobile device Home screen.

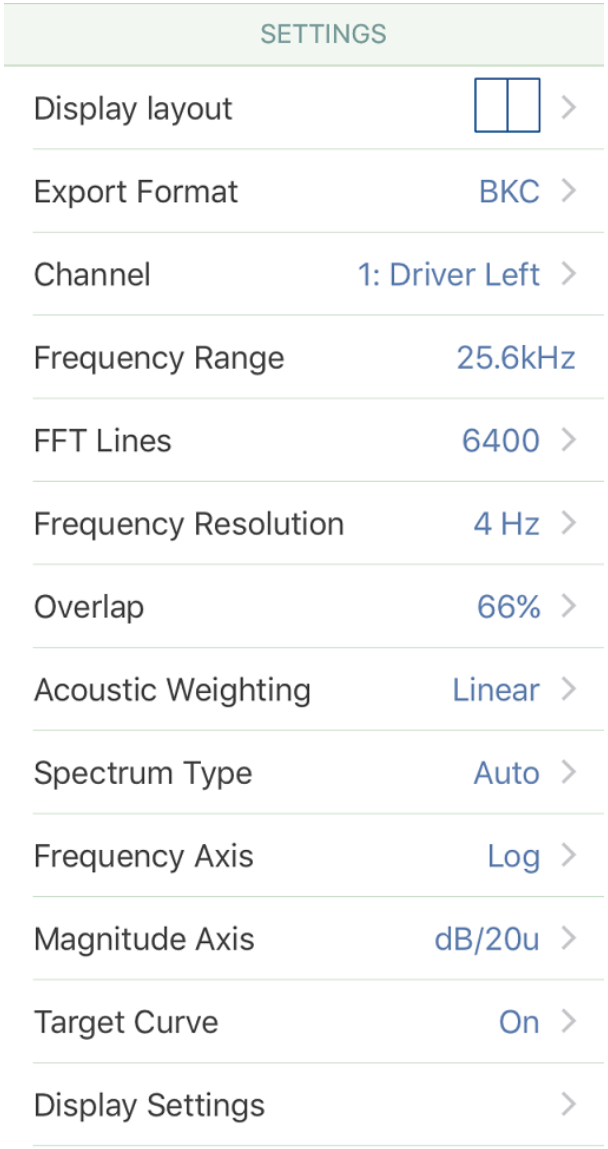
2. Tap *Privacy* and make sure *Location Services* is set to On and *Sonoscout* is set to *While Using*:

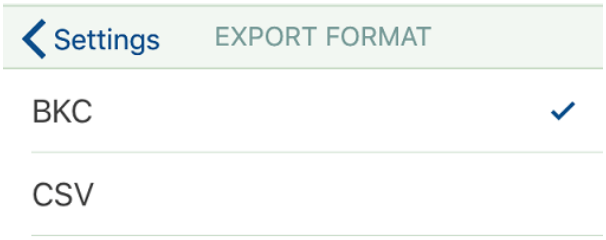


Exporting Results Files

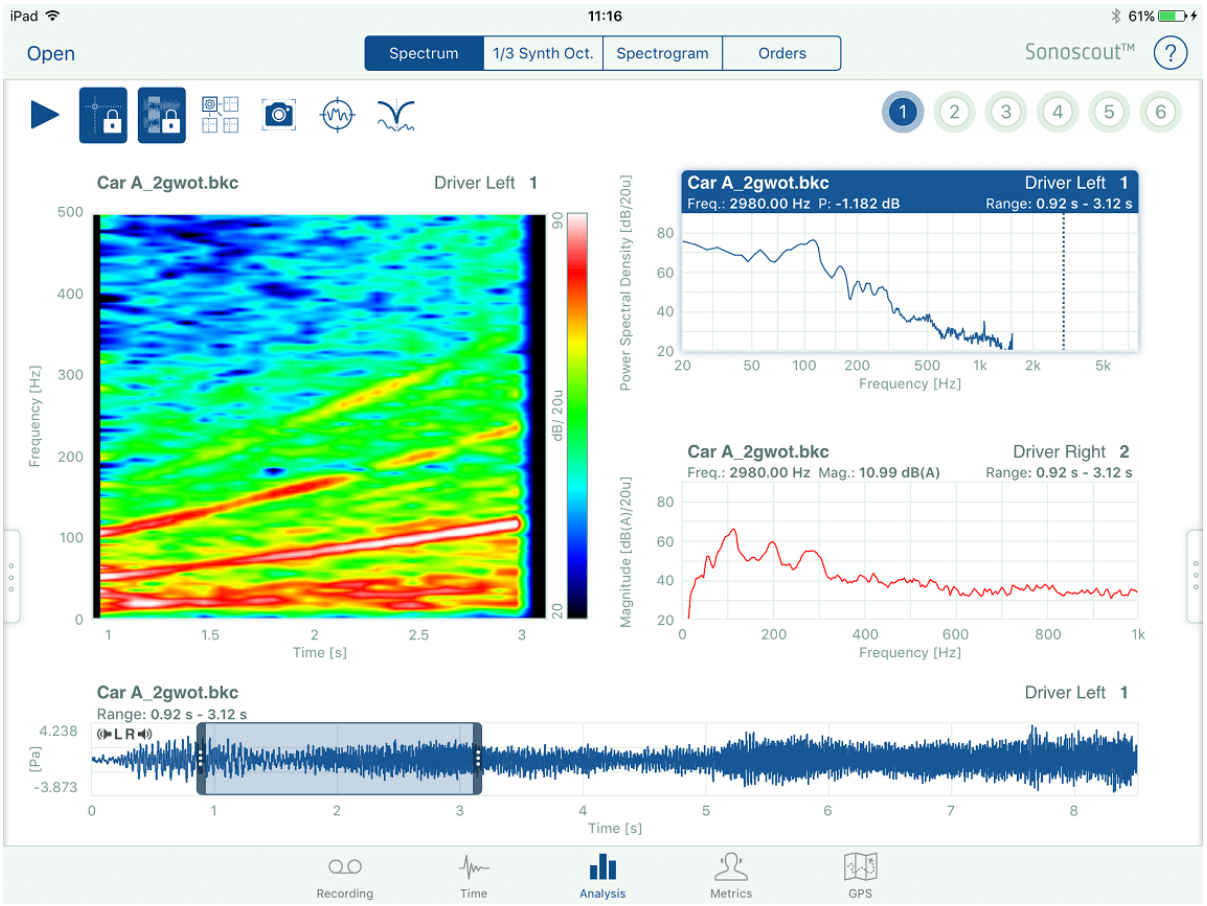
For all Analysis and Metrics displays (except for Spectrogram) it is possible to export the x-y data to a .csv or a .bkc file:

1. Choose the required export format from the Settings menu:



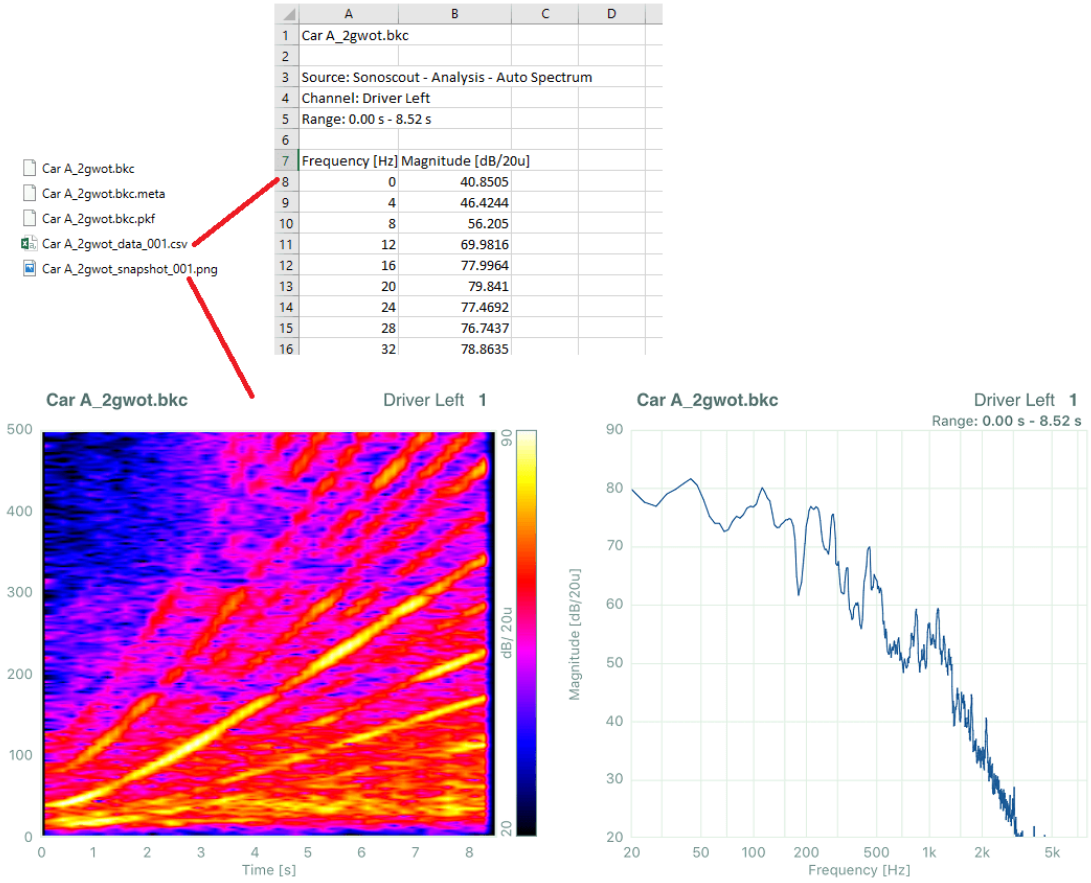


2. Display the required data:



3. Tap the snapshot button.

4. This creates a .png file for the whole display, and a .csv or .bkc file for the active display. The .csv file has the same base file name as the original time history, appended with an incrementing number.



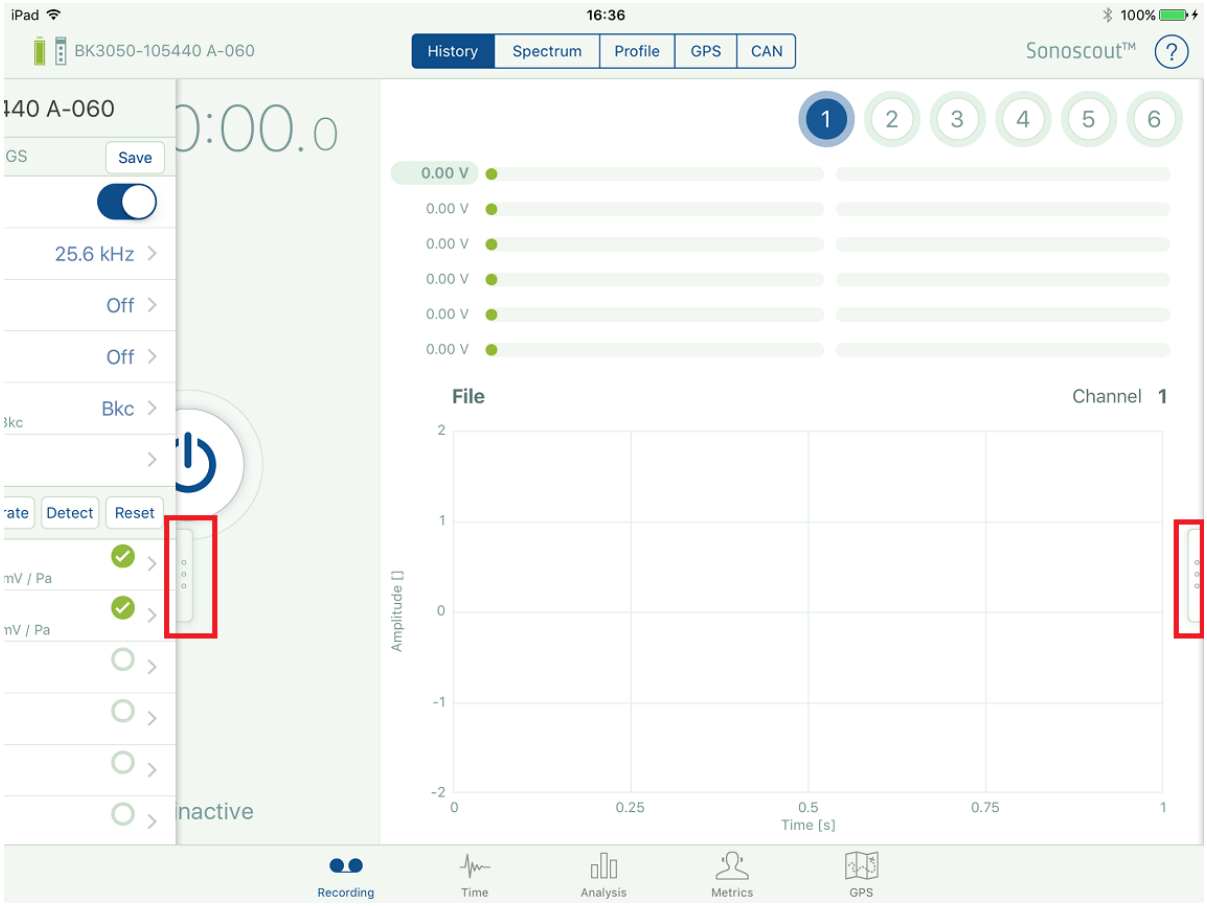
	A	B	C	D
1	Car A_2gwot.bkc			
2				
3	Source: Sonoscout - Analysis - Auto Spectrum			
4	Channel: Driver Left			
5	Range: 0.00 s - 8.52 s			
6				
7	Frequency [Hz]	Magnitude [dB/20u]		
8	0	40.8505		
9	4	46.4244		
10	8	56.205		
11	12	69.9816		
12	16	77.9964		
13	20	79.841		
14	24	77.4692		
15	28	76.7437		
16	32	78.8635		

5. In the GPS Task the .csv file will contain either the x, y coordinates or the speed profile.

Reference

This section contains all the reference material you should need.

The User Interface

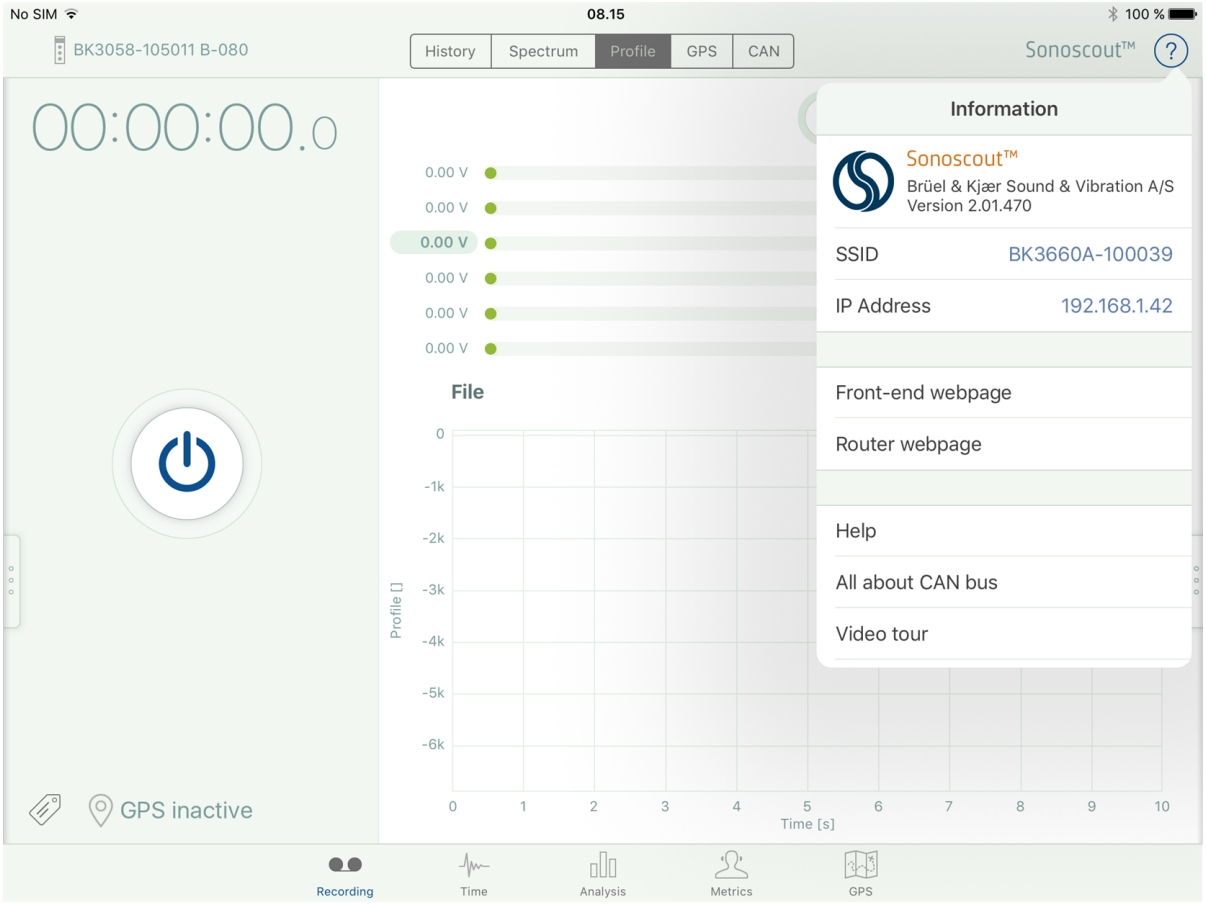


In all tasks, a settings menu is hidden to the left of the display. To open it, tap or swipe the tab from the left of the screen to the right. Place your finger on the frame and swipe to the left to close the menu.

In the Recording Task, a channel table menu is hidden on the right side of the display. Tap or swipe the tab from the right edge of the screen to the left to open.

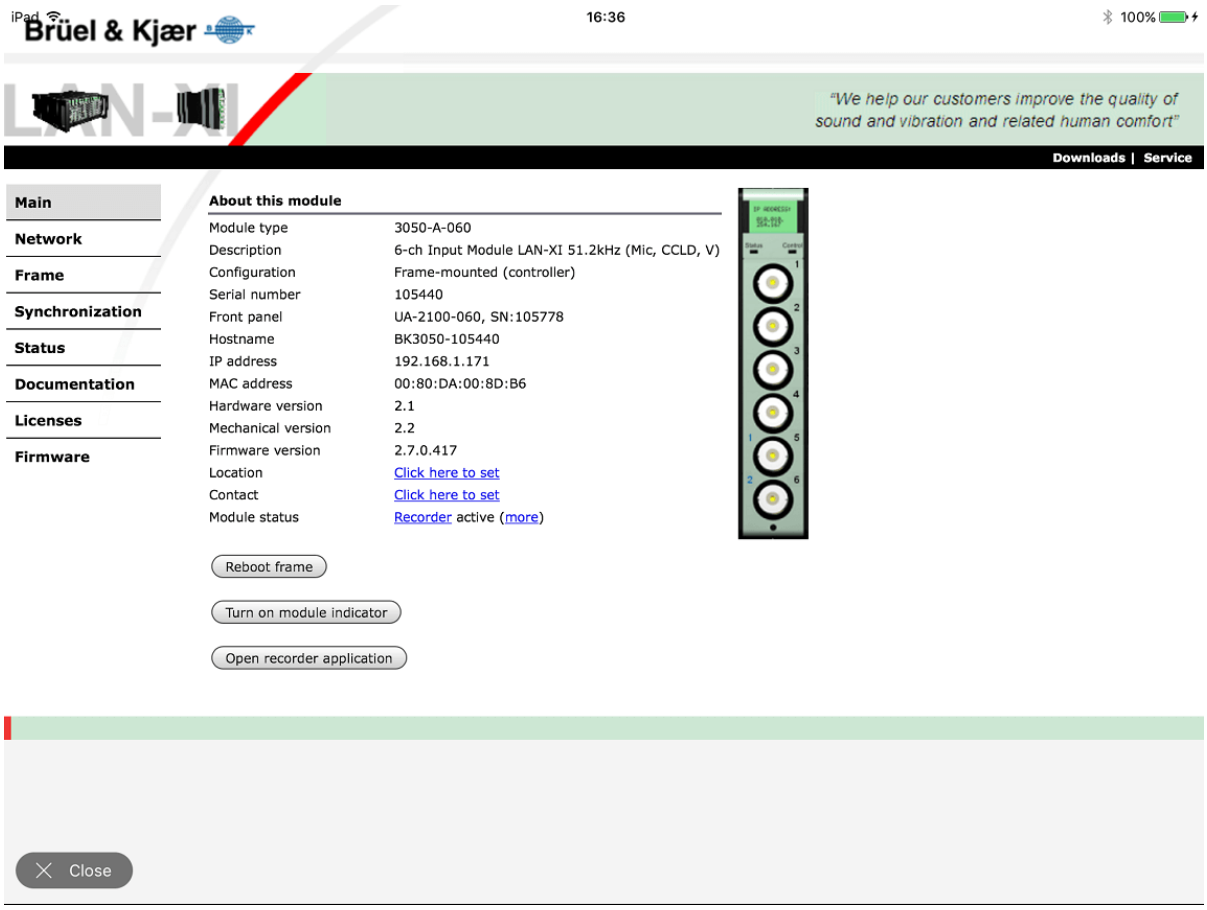
Information/Help Window

Tap the '?' to open the Information/Help window:

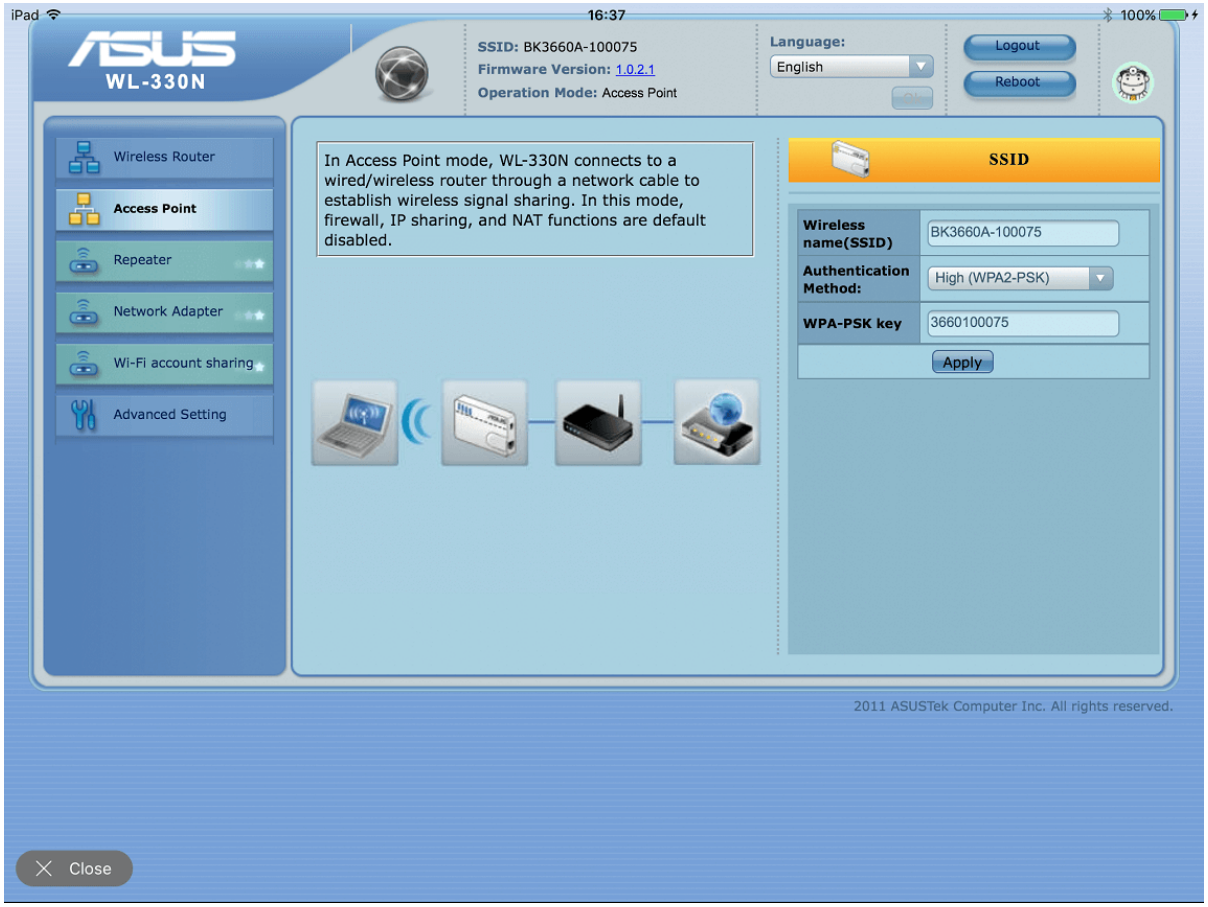


The window includes useful information and links to the following:

Example Front-end Web Page



Example Router Web Page


iPad
16:37
100%
WL-330N
SSID: BK3660A-100075
Firmware Version: 1.0.2.1
Operation Mode: Access Point
Language:
English
Logout
Reboot
Wireless Router
Access Point
Repeater
Network Adapter
Wi-Fi account sharing
Advanced Setting
In Access Point mode, WL-330N connects to a wired/wireless router through a network cable to establish wireless signal sharing. In this mode, firewall, IP sharing, and NAT functions are default disabled.
SSID
Wireless name(SSID)
BK3660A-100075
Authentication Method:
High (WPA2-PSK)
WPA-PSK key
3660100075
Apply
2011 ASUSTek Computer Inc. All rights reserved.
Close

Example Help Page

Home

◄ | ► You are here: Using Sonoscout > Starting Sonoscout

Brüel & Kjær

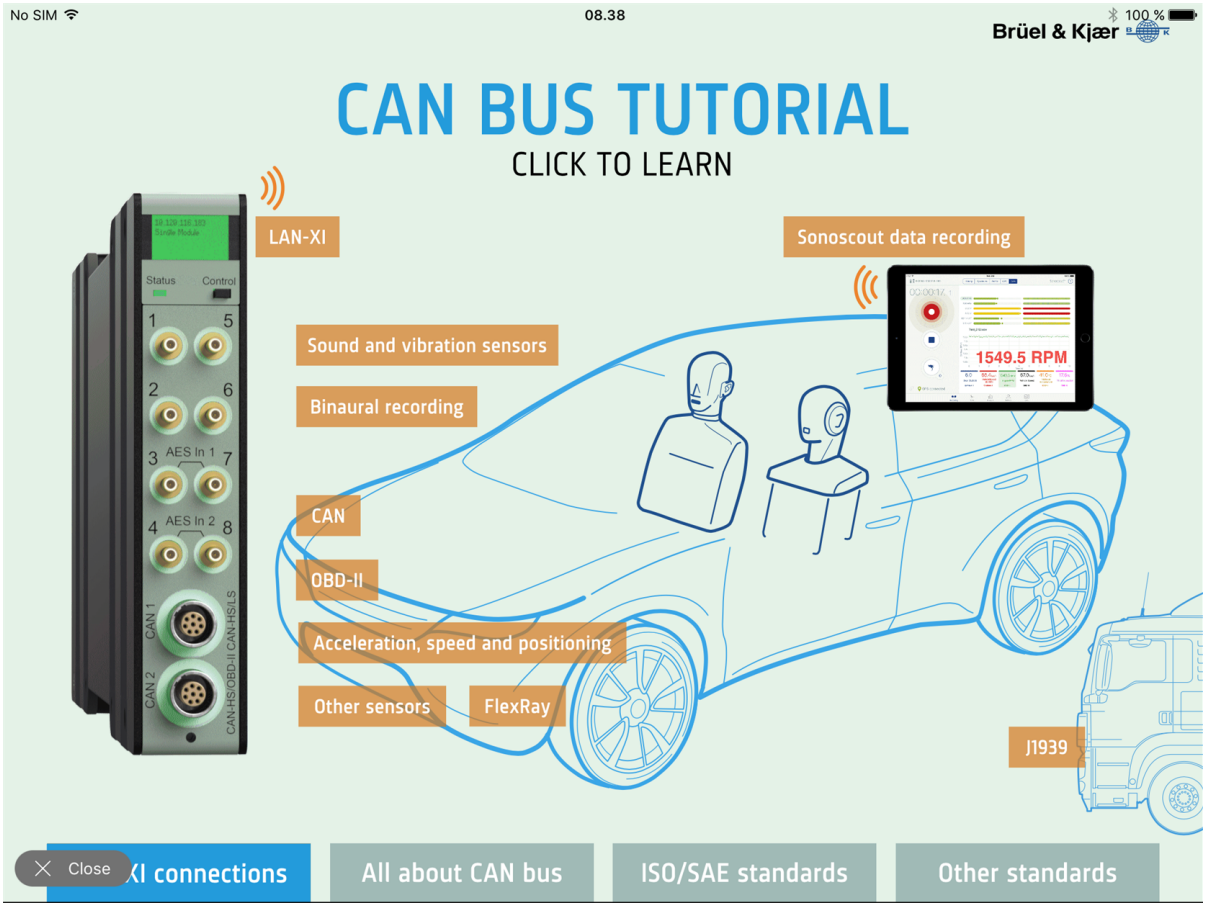
Starting Sonoscout

To start Sonoscout:

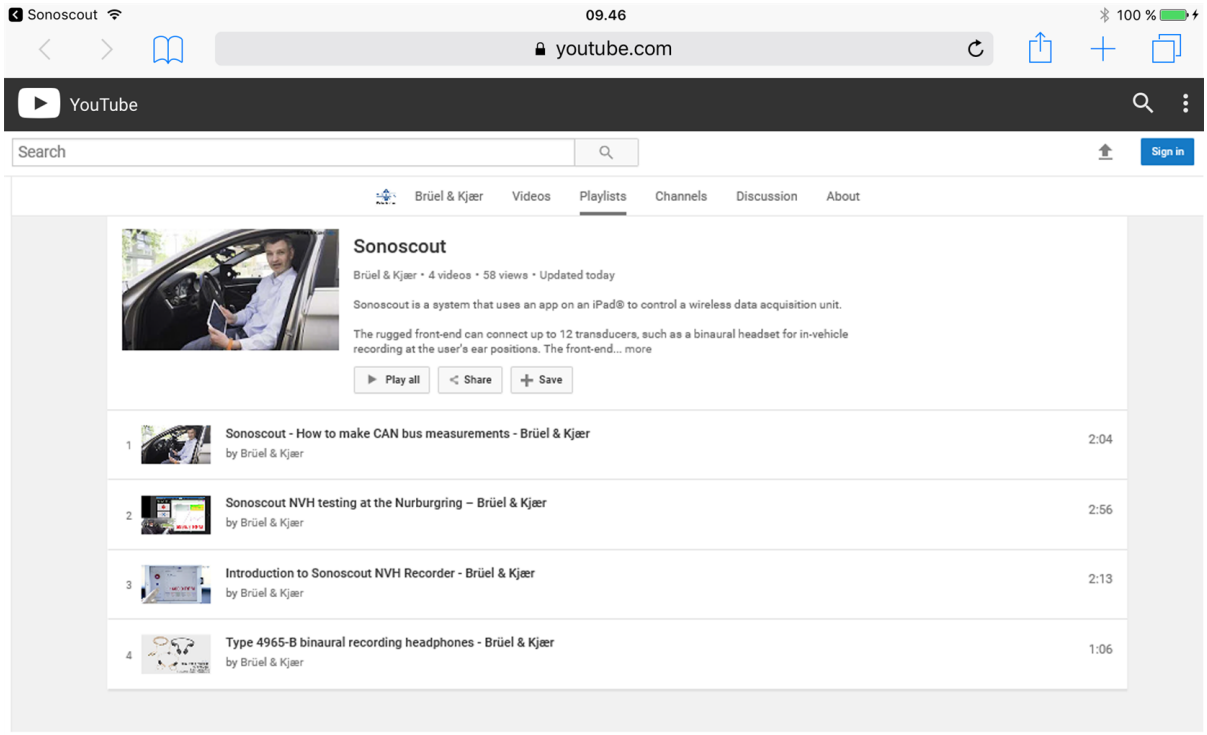
1. From the Home screen tap the *Sonoscout* icon. Sonoscout opens in the Recording Task:

If you are connected to the Internet, these links provide additional background information:

CAN Bus Tutorial



Video Tour


Sonoscout
09.46
100 %
youtube.com
YouTube
Search
Sign in
Brüel & Kjær
Videos
Playlists
Channels
Discussion
About
Sonoscout
Brüel & Kjær • 4 videos • 58 views • Updated today
Sonoscout is a system that uses an app on an iPad® to control a wireless data acquisition unit.
The rugged front-end can connect up to 12 transducers, such as a binaural headset for in-vehicle recording at the user's ear positions. The front-end... more
Play all
Share
Save
1 Sonoscout - How to make CAN bus measurements - Brüel & Kjær
by Brüel & Kjær
2:04
2 Sonoscout NVH testing at the Nurburgring – Brüel & Kjær
by Brüel & Kjær
2:56
3 Introduction to Sonoscout NVH Recorder - Brüel & Kjær
by Brüel & Kjær
2:13
4 Type 4965-B binaural recording headphones - Brüel & Kjær
by Brüel & Kjær
1:06

Task Overview

There are five main tasks in Sonoscout:

- Recording
- Time
- Analysis
- Metrics
- GPS

To switch between tasks, tap the icon at the bottom of the screen.

Each task has its own sub-tasks at the top of the screen.

Each sub-task has its own settings menu.

Recording Task

The Recording task provides the interface for set up and running an NVH Recording.

In this task you can:

- Select and set up the front end (for example, defining storage settings so you can stream directly to the mobile device, or save to SD card)
- Define tacho and analog CAN channels
- Auto-calibrate
- Record (with pre-triggering and auto-stop options)
- Record GPS
- View peak and level meters
- View real time waveforms, spectra and profiles whilst recording
- Save your recording in multiple native file formats
- Use markers to identify specific events or selections
- Use the Demo mode for trying out the entire measurement process when a front end is not available
- Start recording:
    - View time histories, spectra and profiles (tacho and CAN) in real-time
    - Large digital readout of a selected profile channel to ensure that the correct test condition is achieved
    - GPS is automatically recorded if available on the mobile device, that is, if the device's cellular is enabled
    - Identify important events using markers

Recording States

State 1

When you switch on the hardware, it goes into "Standby" mode. There is no streaming of data from the Front-end.

State 2

Data streaming starts when you switch on the Sonoscout app. The system is in "pre-recording" mode, streaming of data from the Front-end has started, but no data is recorded.

State 3

Data recording starts when you tap the Record button in the app. System is in the 'Recording' mode. Enabled channels are being recorded

State 4

Data recording pauses when you tap the Record button in the State 3. System is in the 'Recording paused' mode. Streaming of data from the front end is continuing (but is **not** being recorded)

State 5

Data recording stops when you tap the Stop button. System is in the 'Recording stopped' mode. Recorded files are being stored on the device/SD Card, data streaming continues.

State 6

Data streaming stops when you tap the Stop Data Streaming button. System is back in the 'Standby' mode. There is no streaming of data from the front end

Note: There must be a connection between your mobile device and Sonoscout hardware to begin data streaming and recording.

Peak Level Meters

You can monitor the peak level meters and time history of each channel using the real-time displays.

The peak level meter bars display the instantaneous and maximum levels for each channel. Full-scale deflection corresponds to the maximum input level. The green color indicates the signal is in the normal range and yellow indicates the signal is in the 'Headroom'. (To help avoid overloads, you can specify a headroom at the upper limit of the dynamic range, so signals which are above this limit are indicated in yellow, or red if overload occurs.)

Level History Display

The level history display is constantly updated. When a recording is complete, the display is fixed until you tap Record/Pause or Stop. The level history uses a range of colours to indicate level, the highest being indicated by red and the lowest by black.

Time Task

The Time task is where you:

- Perform a visual check of all channels in a time history
- Display tacho and CAN Profiles
- Display all channels as a strip chart
- Convert time files to different formats
- Audition any channel, or pairs of channels, as a stereo sound
- Add additional markers whilst listening
- Edit the metadata, for example, add additional comments, apply descriptions to markers, etc.
- Trim to a selected range, for example, if you need to break a long file up into a set of smaller files
- Copy data from the SD Card to the mobile device
- Delete files and folders

Functions Available in Time Task

- Use multi-touch to zoom in/out on the x and y axes
- Use touch and drag to move the time history left/right or up/down
- Double-tap the display to restore to the default display settings
- In the Time display, double-tap on the y-axis to autorange the amplitude
- Tap to play an individual channel or a pair of channels as a stereo sound. It will play the complete file as a continuous loop (with cross-fade at the ends to prevent a click). The data is always resampled to 44.1 kHz whatever the original sampling rate
- Tap on the time display to get a cursor line with the cursored values at the top of the display, this is the Play cursor. Tap to play the time file from that point. Tap to return the Play cursor to its starting position
- Touch and hold your finger on the display to highlight a range from the position of the Play cursor to the point you touched. Tap to play the range as a continuous click-free loop. You can extend the range by touching (and holding) either side of it
- You can switch channels at any time (whilst playing) and the sound will continue to play (click-free) from the position of the play cursor at the instant of switching
- Once selected, each channel button has a different color which remains constant for all the 2D displays (time, frequency, metrics…) for that channel

Analysis Task

Overview

This is a very flexible task for calculating and displaying frequency spectra.

The main features are:

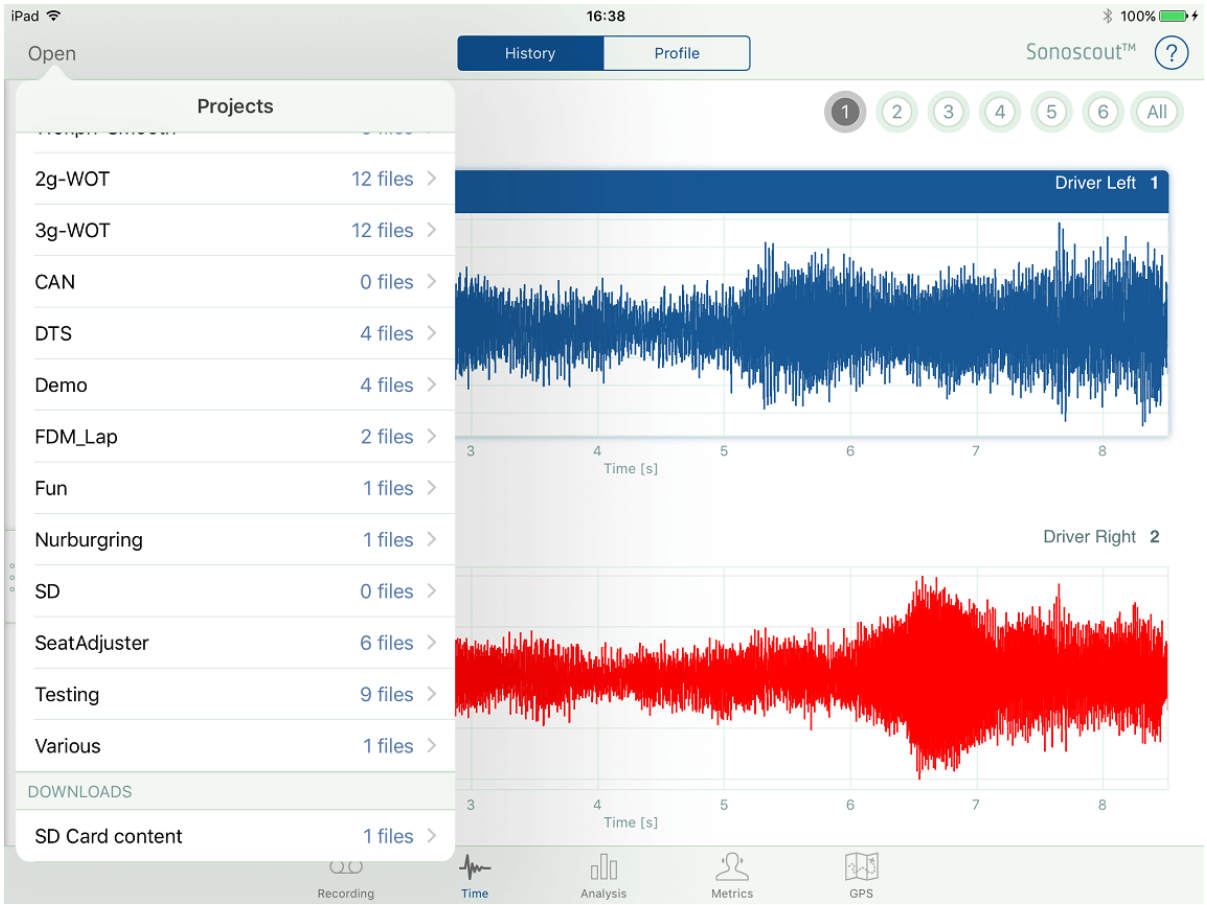
- Analysis using these methods:
  - Autospectrum or PSD
  - 1/3-octave (synthesized from FFT)
  - Spectrogram
  - Order analysis (Overall level plus an order)
- Look and listen at the same time
  - Real-time or Averaged spectra
- Compare results from different channels in the same file or from different files
  - Same type of spectrum for different channels
  - Different types of spectra for the same channel
  - Same channel from different files
- Use touch and multi-touch gestures to change the displays
- Propagate settings
- Synchronize cursors and ranges
- Export results to CSV or BKC files
- Save screenshots of the displays
- Select 1,2,3,4 curves to overlay in a single display with multi y-axis support
- Create, import and display target curves with tolerance bands
- RPM Finder:
  - create and embed an RPM profile from the harmonic content of a Spectrogram
- Simple filtering:
  - Apply any combination of Low-pass, High-pass and Notch (Fixed Frequency or rpm-Tracked) filters to any channel in a file
  - Switch between original and filtered files in real-time and see/hear the difference

Opening Files

If you use the Streaming option (see Setting up a Recording) the file will be recorded directly onto the mobile device.

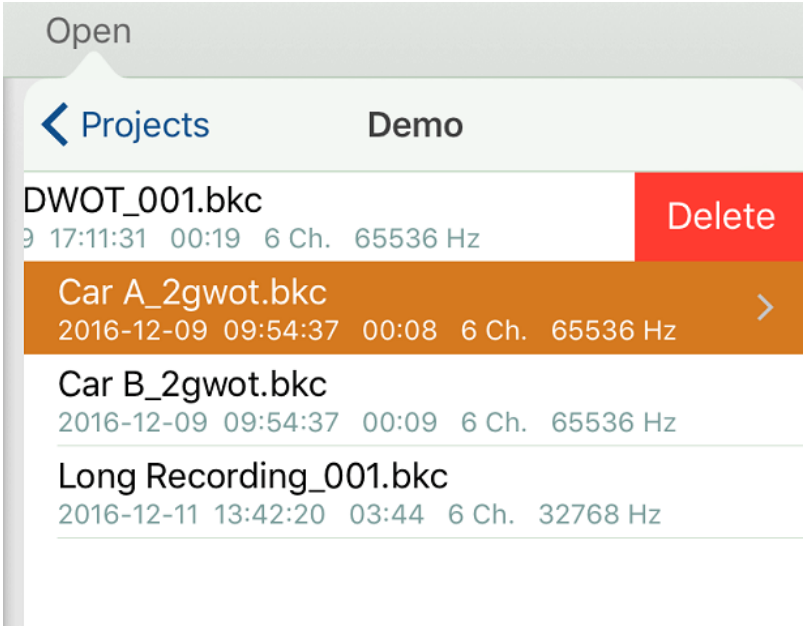
In all tasks other than Recording, you can see which folders/files are on the mobile device by tapping Open.

In the following example, the *Demo* folder contains demonstration files included in the installation and all other folders were created by the user:



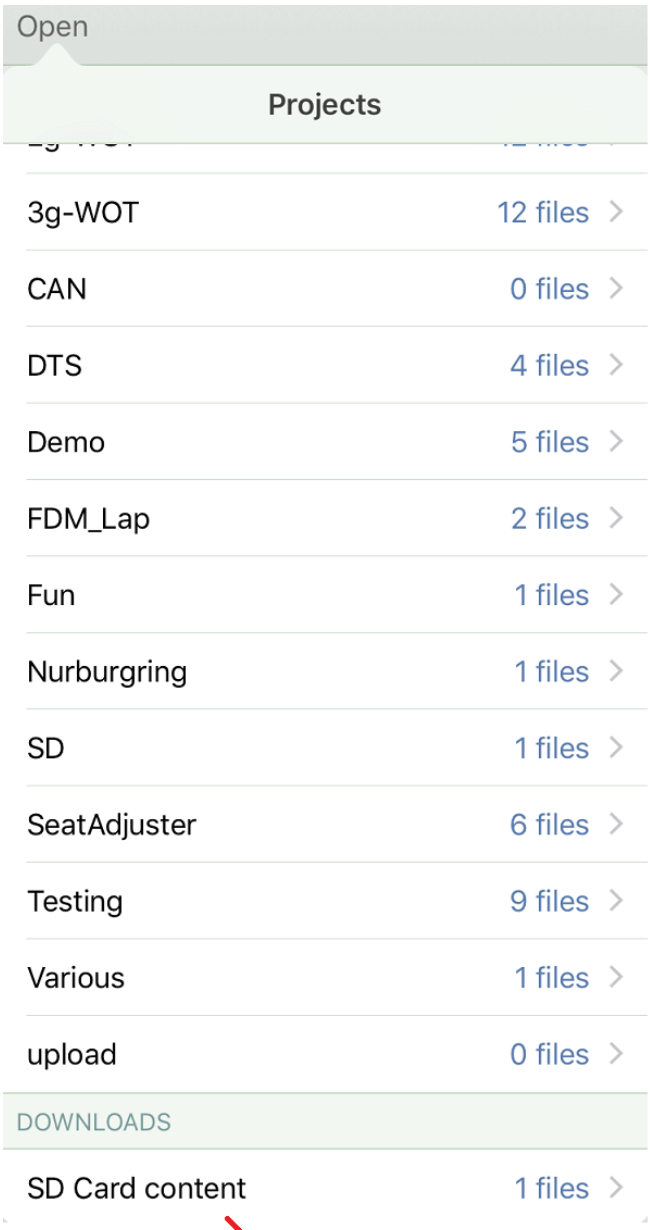
If you switch to the Time task as soon as you have stopped recording a file, the last file you recorded will automatically be open ready to play.

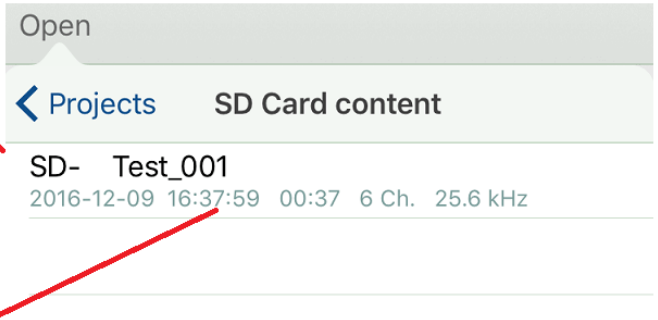
If you touch, hold and slide your finger to the left on a filename a **Delete** button appears which allows you to permanently remove files from the mobile device:

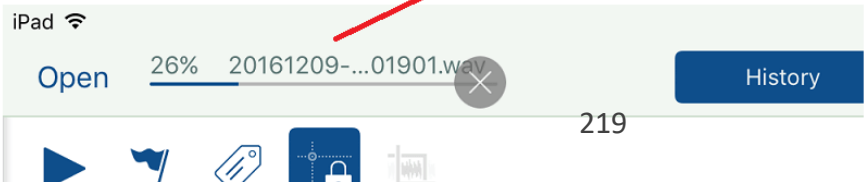


If you did not use the Streaming option the file you just recorded will be on the SD Card.

You can see which files are on the SD Card by tapping *SD Card Content*. This opens a list of all files on the SD Card. If you tap one of the filenames this file will be downloaded to the mobile device and stored in a folder that has the same name as the one you set up in *Record Settings*. In the example below the Project folder name will be *SD* and the file base name will be *Test*:

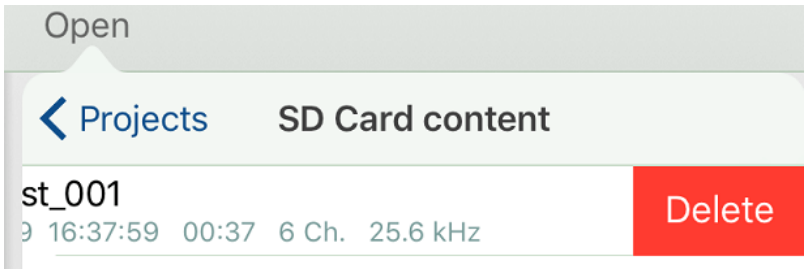

Open
Projects
3g-WOT 12 files
CAN 0 files
DTS 4 files
Demo 5 files
FDM_Lap 2 files
Fun 1 files
Nurburgring 1 files
SD 1 files
SeatAdjuster 6 files
Testing 9 files
Various 1 files
upload 0 files
DOWNLOADS
SD Card content 1 files


Open
Projects
SD Card content
SD- Test_001
2016-12-09 16:37:59 00:37 6 Ch. 25.6 kHz


iPad
Open
26%
20161209-...01901.wav
History

A progress bar is displayed during file transfer.

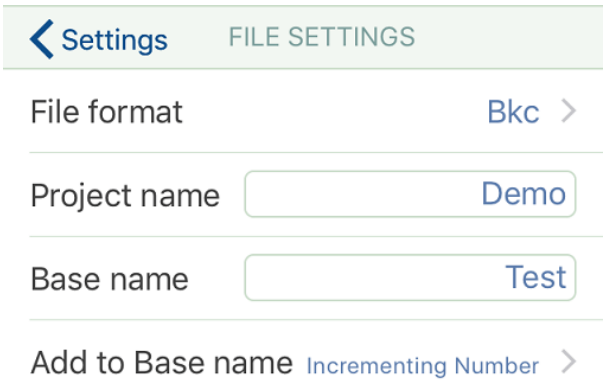
If you touch, hold and slide your finger to the left on a filename a **Delete** button appears which allows you to permanently remove files from the SD Card.



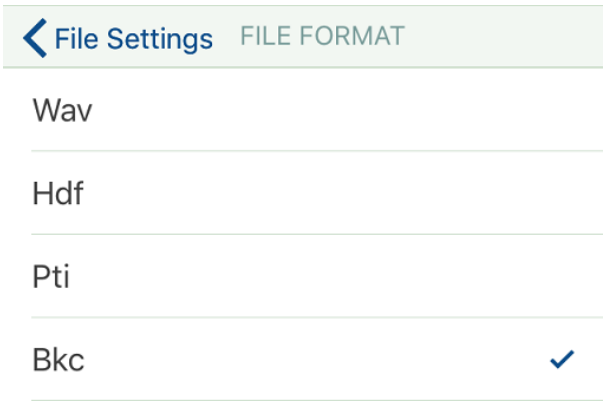
File and Folder Names

Use *File Settings* to set up the file type and file names for recorded time histories:

You can enter a *Project Name* (that is, the name of the folder where the file will be saved) and a *Base name* (a base file name), which will be used for all recorded files:



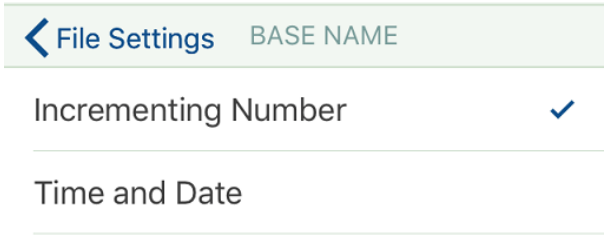
Sonoscout can record files directly in one of four formats:



- *wav*: Wave file (default) - this is the only format supported when recording to the SD card
- *hdf*: Hierarchical data format
- *pti*: PULSE™ Time file
- *bkc*: Brüel & Kjær common file - this is the preferred format if you intend to process your data in PULSE™ Reflex. With the exception of the GPS coordinates, all the metadata created in Sonoscout is stored directly in the .bkc file and is available to you in PULSE™ Reflex.

Simply tap the format you require from the list that appears.

You can choose whether to append the Date/Time or an Incrementing number to the Base file name. So in this example the first recorded file would be called *Test_001.bkc* and be located in the folder called *Demo*:



Created Files

Each recording you make generates a set of files with the same base name. For example, if you use a base name called 'Sono', the filenames will be:

- *Sono_001.bkc*
- *Sono_001.meta* – contains all the metadata plus the GPS coordinates
- *Sono_001.pkf* – file containing the peak history of all channels. It significantly speeds up the time taken to display long time histories. If it is missing for some reason, it will be recalculated

If you record CAN data using LAN-XI CAN Module Type 3058 , some additional files will be created:

- *Sono_001.bkc.can1* – raw CAN data from CAN 1 channel (if enabled)
- *Sono_001.bkc.can2* – raw CAN data from CAN 2 channel (if enabled)

In addition if you **Trim** a file over a range, the start and end time of the range are appended to the filename, for example:

- *Sono_001_10.724-30.456s.bkc* - together wi th equivalent .meta and .pkf files

If you take a **Snapshot**, an image and .csv file are created where the filename includes the name of the data file:

- *Sono_001_snapshot_001.png* and *Sono_001_data_001.csv* and *Sono_001_result_001.bkc*

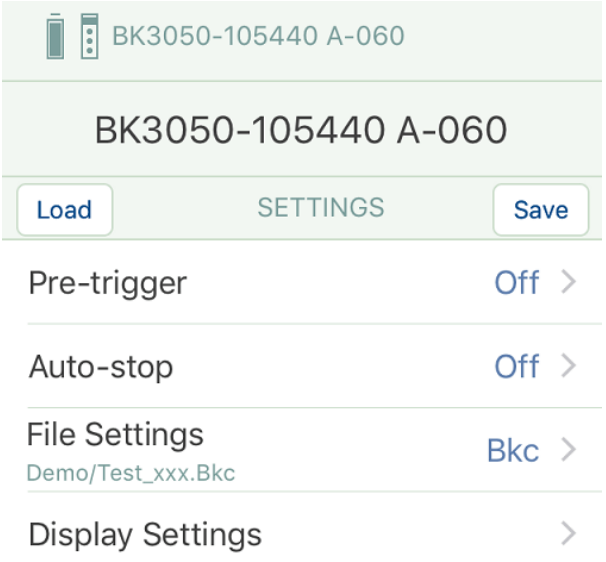
If you save a **Target Curve**, it is saved into the *Target Curves* folder with the name: *TargetCurve_00N* (where N is a number that increments by 1 each time you save a new curve).

Folders

Each set of files is stored in a folder (called a Project in the app). All folders are at the same level, that is, you cannot have folders within folders.

Settings you can Change While Pre-recording

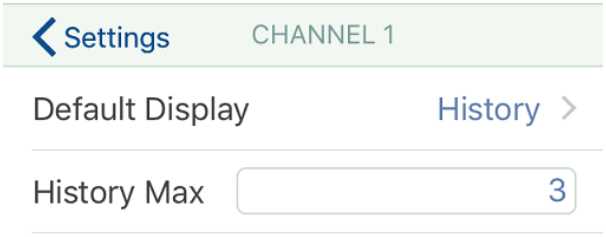
All the following settings can be changed without stopping pre-recording:



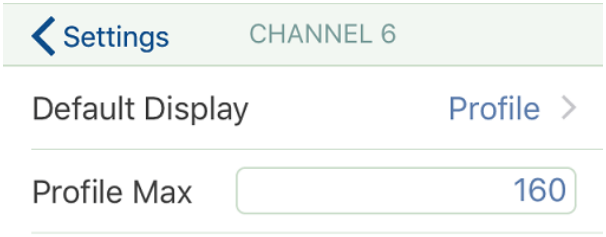
However, in the Channel Settings list:

Only some of the settings can be changed without stopping pre-recording. These are as follows:

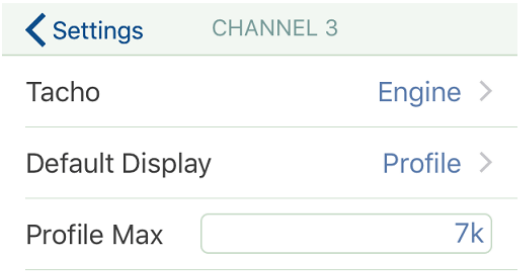
1. With *Channel Type* set to *Signal*, these can be changed:

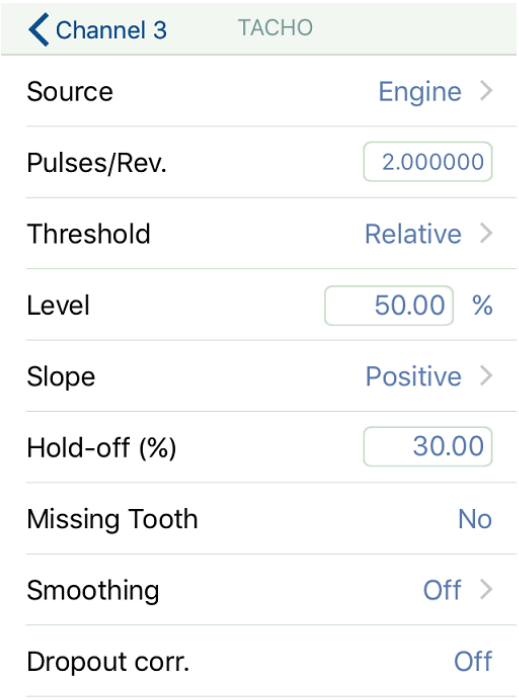


2. With *Channel Type* set to *CAN Voltage*, these can be changed:



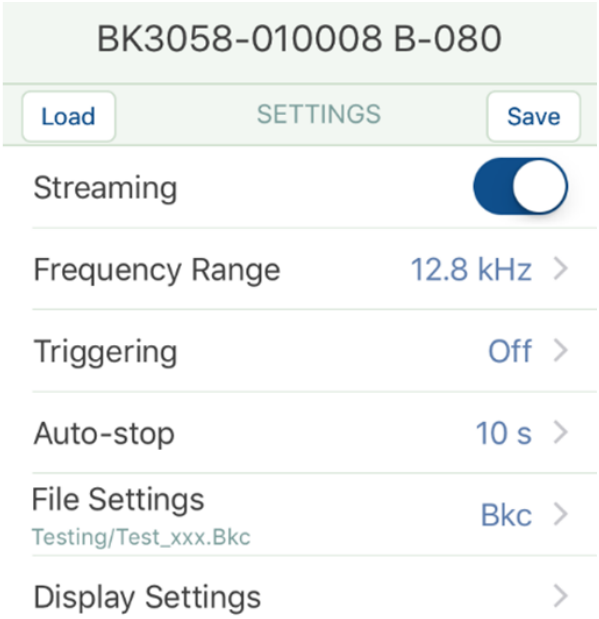
3. With *Channel Type* set to *Tacho*, these can be changed:


Settings
CHANNEL 3
Tacho
Engine
Default Display
Profile
Profile Max
7k

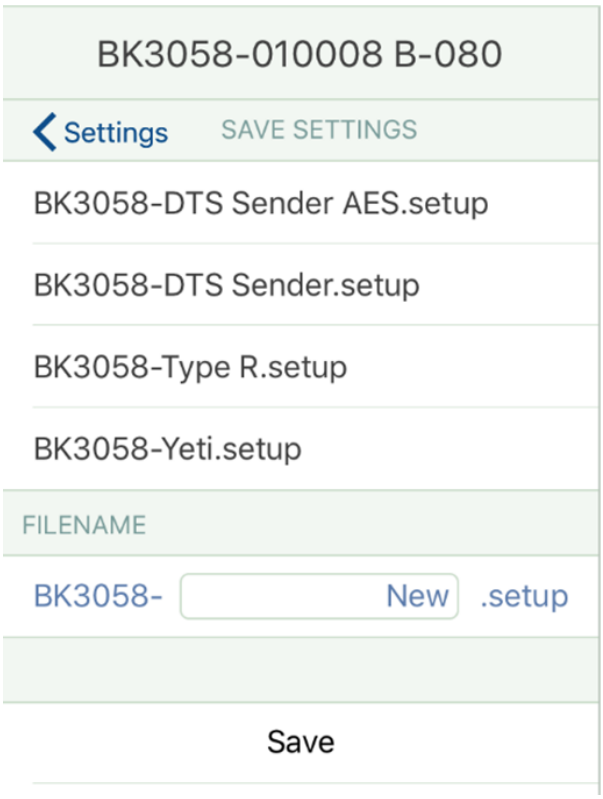

Channel 3
TACHO
Source
Engine
Pulses/Rev.
2.000000
Threshold
Relative
Level
50.00
%
Slope
Positive
Hold-off (%)
30.00
Missing Tooth
No
Smoothing
Off
Dropout corr.
Off

Saving and Loading Recording Setups

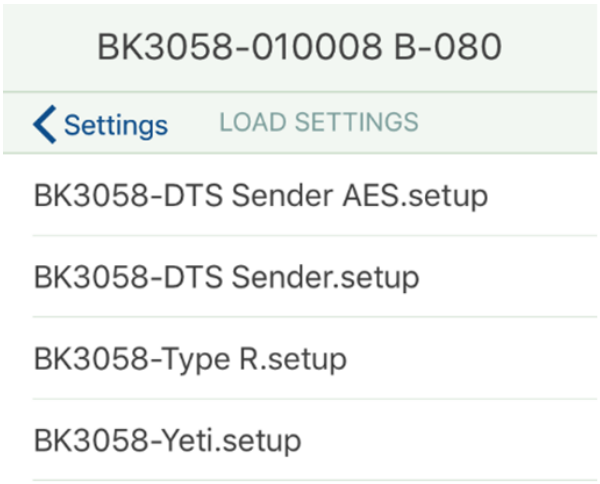
1. All the recording setup information is stored on the mobile device in a default file, the name of which is the type and serial number of the currently connected LAN-XI module, for example: *BK3058-010008 B-080.setup*:



2. If you wish to create and keep a number of different setups you can tap the **Save** button (see above) and save the settings to file. The name of the created file always starts with the module type number *BK3058-myown.setup*:



3. You can then use the **Load** button (see above) to load a saved file. (Only those that match the currently connected module will appear in the list:

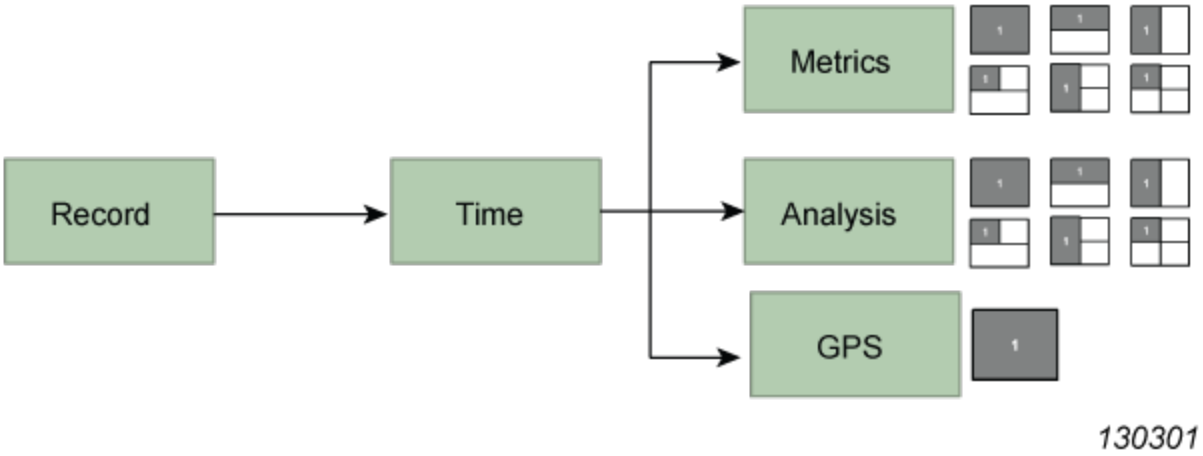


If you do not load a new setup, it will use the existing default file, that is, the

settings you used the last time you pre-recorded or recorded.

Data Flow Through the App

If you Record a file it is automatically loaded into the Time displays, into Display 1 of all other tasks, and any other display which contains the same file as Display 1:



If you open a file in any task it is automatically loaded into the Time displays, into Display 1 of all other tasks, and any other display which contains the same file as Display 1.

Using this simple logic you can:

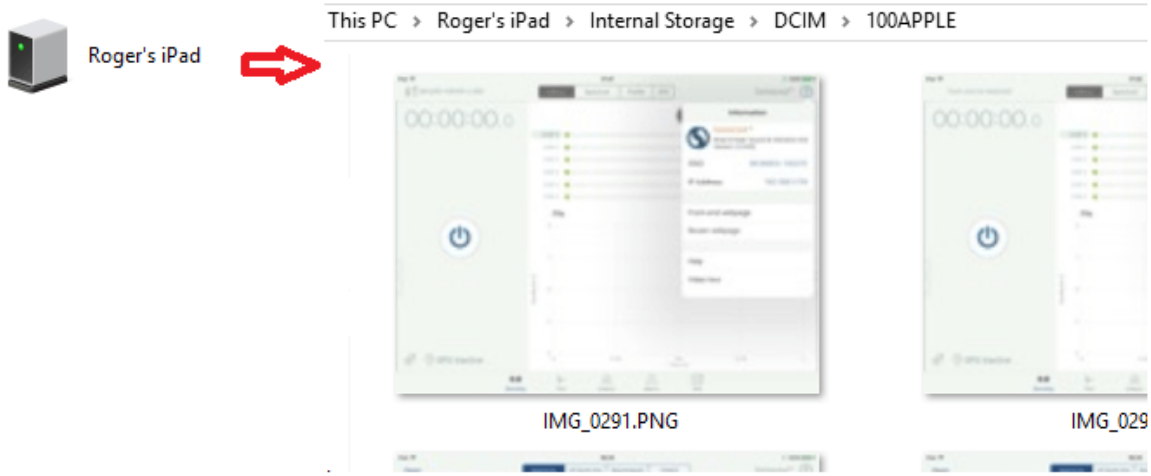
- Update all displays simultaneously, for example, if you want to compare different channels from the same file
- Only update Display 1, for example, if you want to compare new data with previous data

Taking Screenshots

If you want to take a screenshot on the mobile device, tap the **Home** button and **Power** button simultaneously.

This creates an image file on the internal storage of the mobile device (for example on an iPad®, it will be stored under *Photos*).

To copy it onto your PC, simply connect the mobile device to your PC using the USB adaptor cable, open the folder containing the images and copy/paste them as required.:



There is no need to use iTunes® for this process.

Settings Files

The following settings files are used in Sonoscout:

- *BK3053-100387 B-120.setup* - this contains all the settings used in the Recording task
- *BK3053-100387 B-120.calib* - this contains the gain factor for all TEDS transducers calibrated with the system and the sensitivity and gain factor for all manually-defined and calibrated transducers
- *global.settings* - contains the following settings:
    - Calibrator Configurations (for Standard and Custom calibrators)
    - Recording Configurations (for example, File name and Format, Streaming on/off, etc)
    - Analysis Calculation and Display Settings
    - Metrics Calculation and Display Settings
    - Name of last-opened file
    - Metadata entries
- *Virtual Front-end.setup* - default settings for the Virtual Front-end

Virtual Front-end Mode

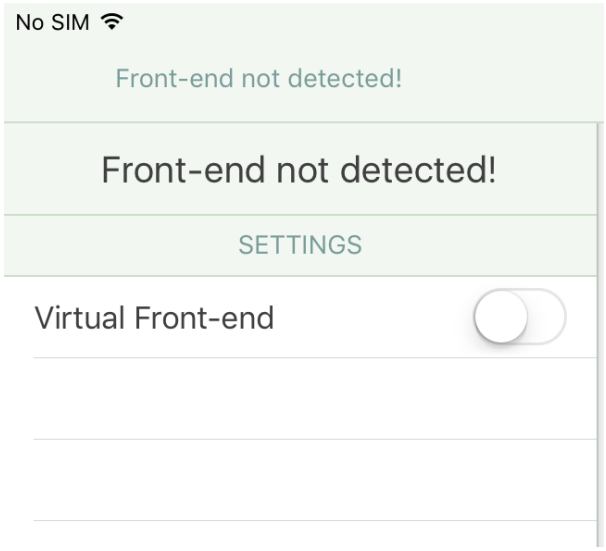
Virtual Front-end Mode (or Demonstration Mode) allows you to test recording functionality without the need for a Sonoscout configuration (installed license plus LAN-XI modules connected). Continue to Running in Virtual Front-end Mode.

If you have installed a license and have the necessary hardware configuration, you can go directly to Using Sonoscout for information on how to use the app.

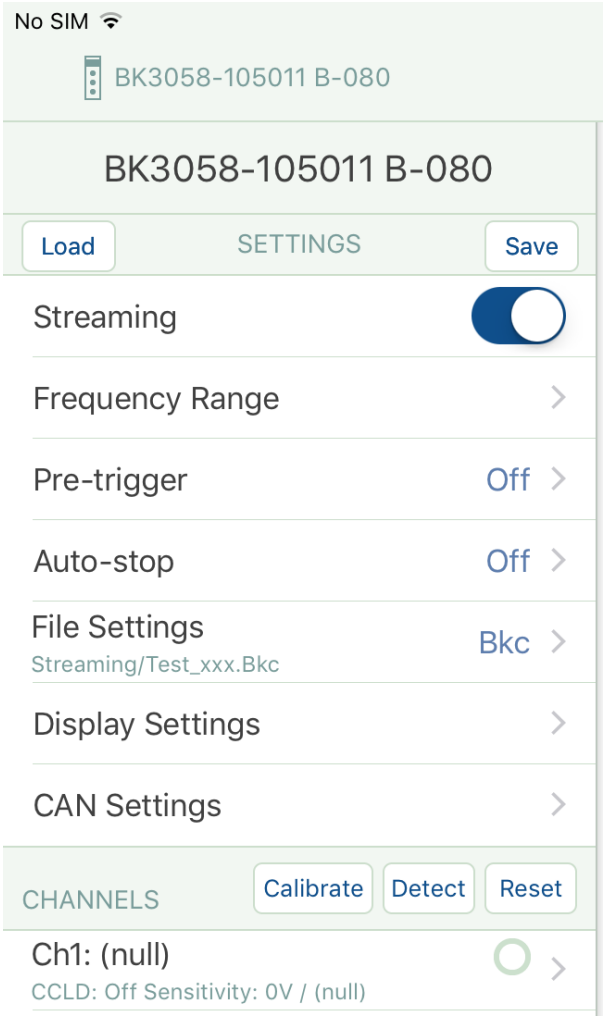
Running in Virtual Front-end Mode

The purpose of the this mode is to allow you to try out the functionality of the Record task without the need for a license (i.e., no LAN-XI connected).

Virtual Front-end Mode is initially switched off by default, so to enable it you need to be disconnected from the Front-end. You can check this by viewing the Settings panel in the Record task, it should display *Front-end not Detected!*:



Note: If you are still connected to a Front-end (with a valid license), the Demo Mode setting will not be visible and the module Settings panel will look like this:



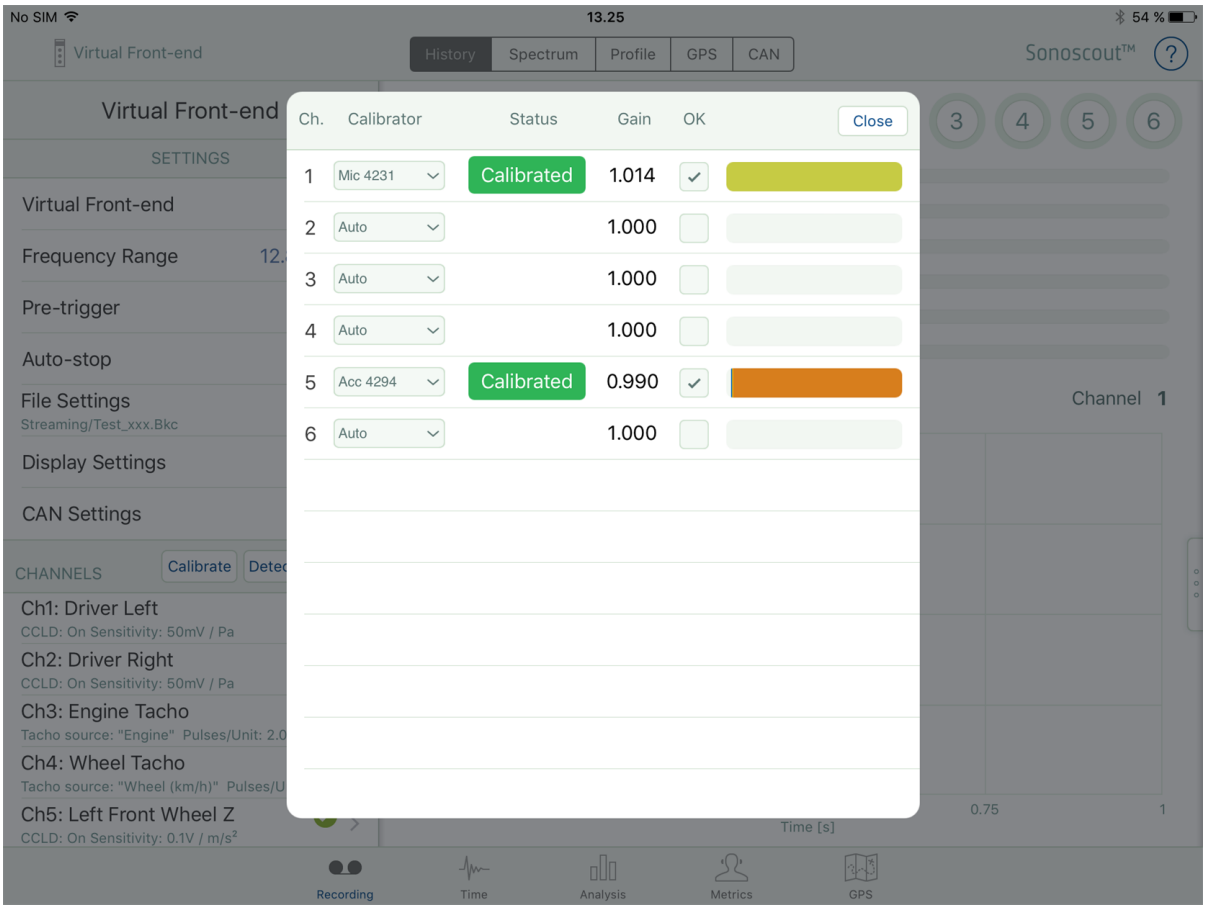
In this case, you need to disconnect from the Front-end and check that the Settings panel displays: *Front-end not Detected*.

Set *Virtual Front-end* to *ON*:

Once in Demo Mode, the displayed Front-end settings are those related to the 'dummy' file, which is installed with the app and emulates a real-time recording.

You can view all the settings but you cannot change any of them. You can, however, set up your own folder and file names (as required).

You can also tap the **Calibrate** button to view the calibration process:



You are now ready to start a recording.

All the standard functionality works, including:

- Pre-recording
- Peak level meters
- Real-time display
- Recording to a file in the format of your choice
- Markers
- GPS (records 'live' data)

The example below shows Pre-recording of a tacho channel in the Demo Mode:

The only difference is that the signals are streamed from a file rather than from a LAN-XI Front-end. Once you have recorded a file you can open and analyse it using all the functionality of the app.

Troubleshooting

If you have any problems using Sonoscout please check this section first for useful information.

Wi-Fi Guidelines

General

- Keep the distance between the iPad and LAN-XI WLAN Frame to at least 0.5 m
- Try to avoid other WLAN's, cordless mice, motion detectors, microwave ovens, etc.

Note: older 802.11b networks will disturb more than newer 802.11n networks, as the lower data-speed will require more "air-time"

On the iPad

- Forget all networks - other than the one you are using (This means that the iPad does not jump to another network if you power-down the WLAN Frame)
- Do not put Sonoscout in the background – this will stop data-streaming
- Avoid keyboard lock (related to the above)
- "Don't Disturb" – disables notifications to other programs (possibly avoiding scheduling). You will see a 'crescent-moon' on the display header
- Consider turning off encryption if it is not needed (at the Wireless Access Point)

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