

CONSENSYS USER GUIDE v1.6

Rev. a



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WHAT'S NEW IN THIS RELEASE

Consensys v1.6.0 brings a number of software updates and bug fixes

Updates:

- Available in 32-bit and 64-bit
- GSR calibration improvements
- Gyroscope 'on-the-fly' calibration algorithm
- Support for Shimmer3 200g IMU
- Various bug fixes

INTRODUCTION

Consensys v1.6.0 is used with a *Consensys Base6* during the creation of this guide.

Supported Software: ConsensysBASIC / ConsensysPRO

Supported Hardware: *Shimmer Dock* / *Consensys Base6* / *Consensys Base15* / all *Shimmer3 Units*.

Supported Firmware: *SDLog* / *LogAndStream*.

Follow the links for more information on:

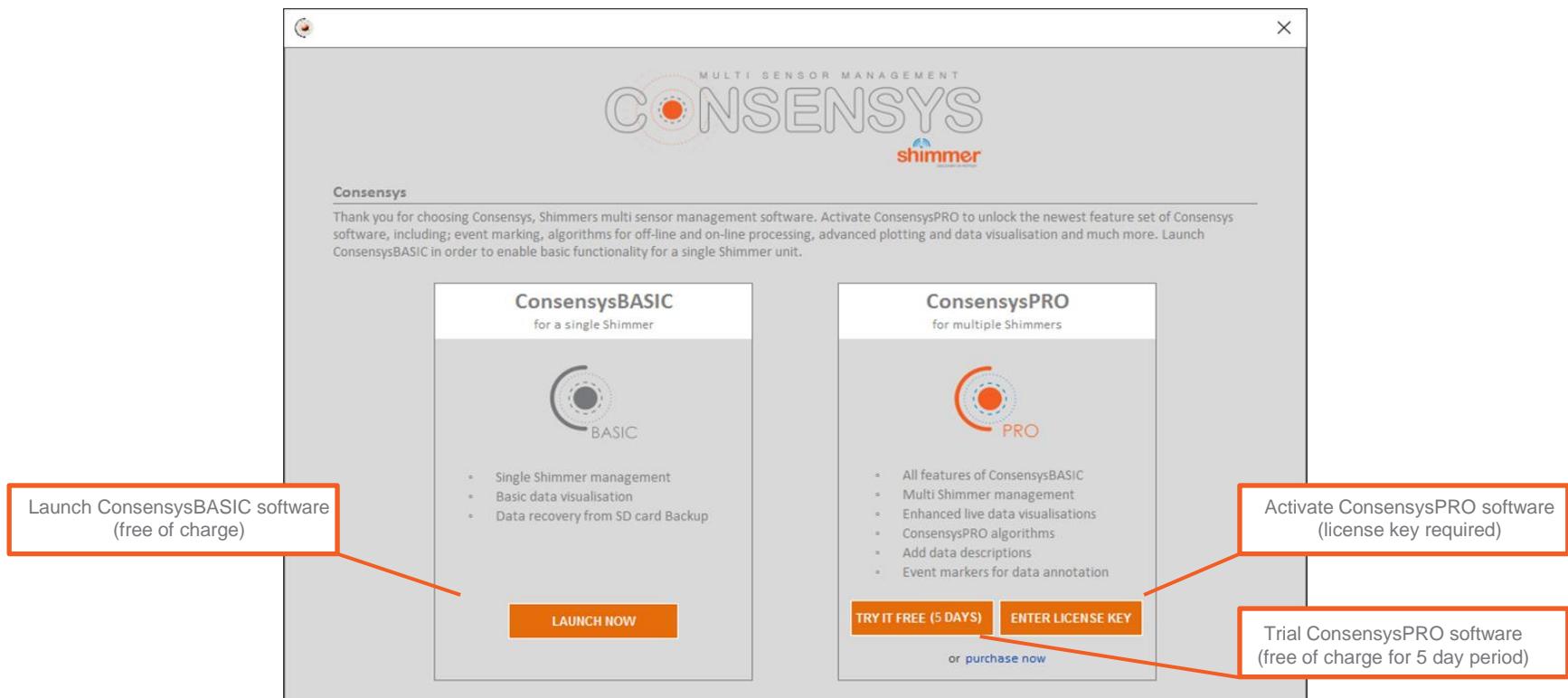
- *Consensys Software* – <http://www.shimmersensing.com/menu/products/consensys>
- *Consensys Base6* - <http://www.shimmersensing.com/menu/products/consensys-base6>
- *Consensys Base15* - <http://www.shimmersensing.com/menu/products/consensys-base15>
- *Documentation & Downloads* – <http://www.shimmersensing.com/menu/support>

CONSENSYSBASIC v CONSENSYSPRO

Consensys v1.6.0 comprises of two applications, ConsensysBASIC and ConsensysPRO.

ConsensysBASIC – Basic functionality for a single Shimmer unit

ConsensysPRO – Advanced functionality for multiple Shimmer units including event marking, off-line and on-line processing, event marking, advanced plotting and data visualisation and much more



INSTALL HARDWARE & SOFTWARE (1/8)

STEP 1 – Download the *Consensys* software from our [website](#)[†].

STEP 2 – Connect the AC adapter with the *Base*.

STEP 3 – Plug the power cable into the AC adapter and a mains power socket.

STEP 4 – Connect the USB cable from your computer to the *Base*.

STEP 5 – Windows will now install the drivers for the *Base*. Status feedback is given in Windows' system tray; right bottom corner of the screen:

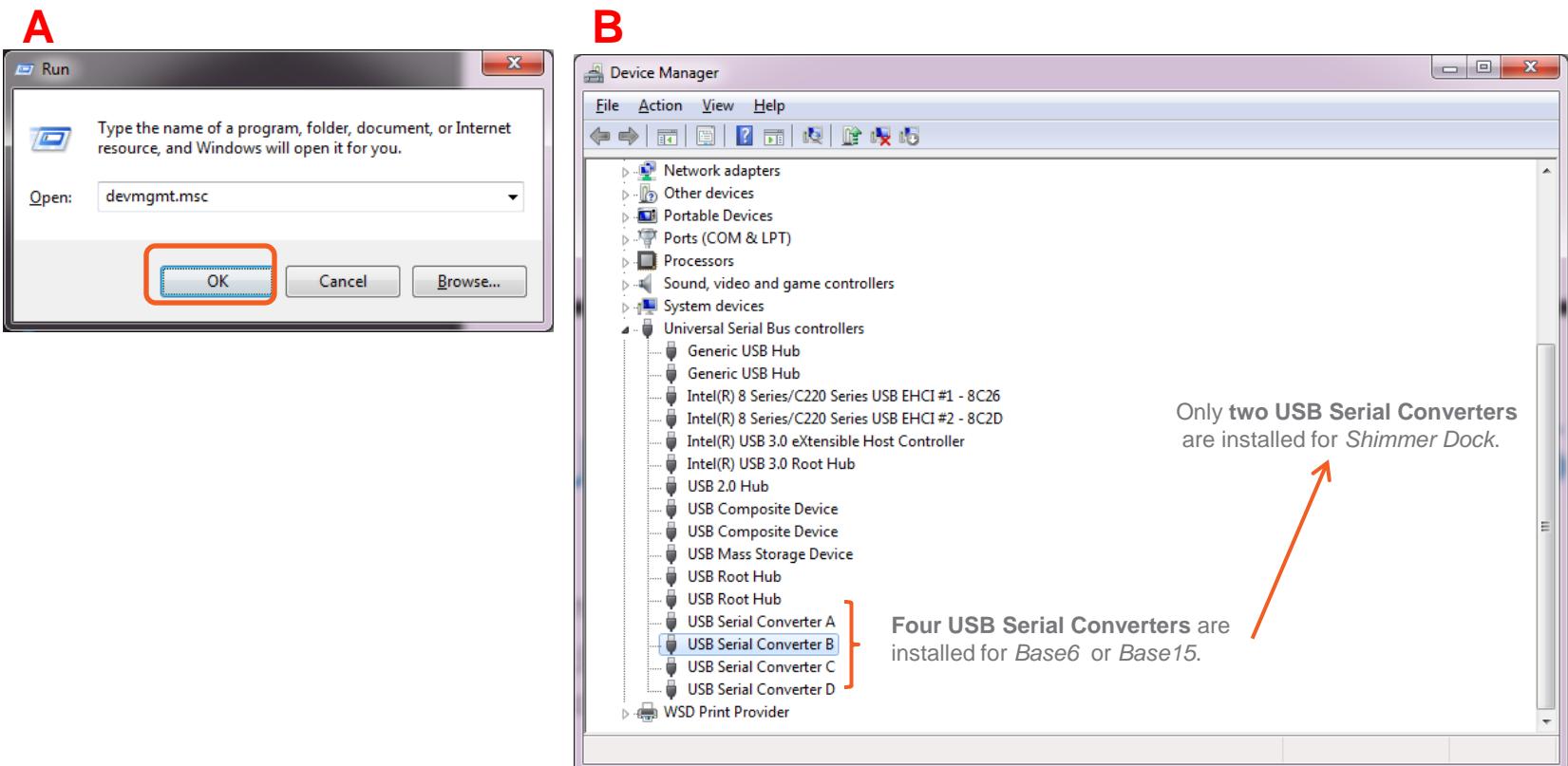


N.B. The driver installation can take up to a few minutes. In case you are not sure if the installation has finished, just go to the next STEP to verify the driver installation.

INSTALL HARDWARE & SOFTWARE (2/8)

STEP 6 – Verify driver installation:

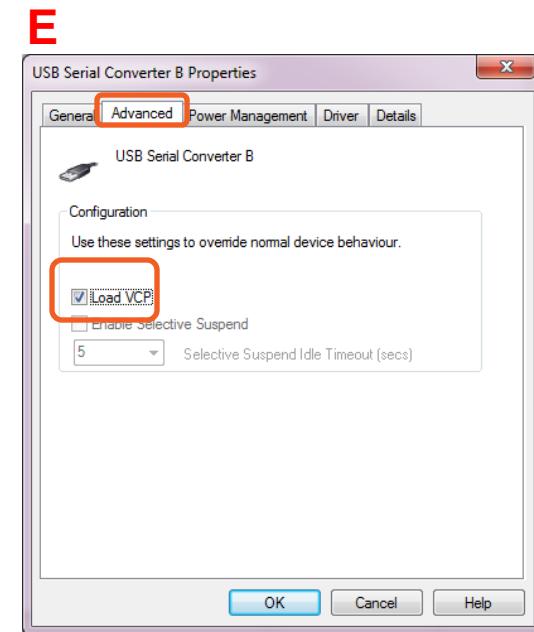
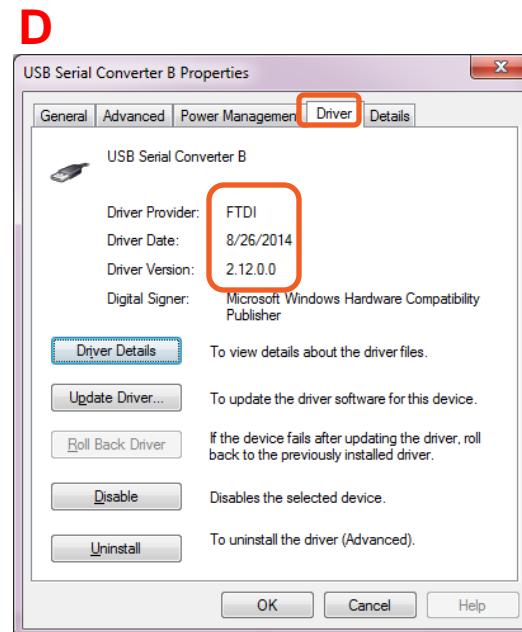
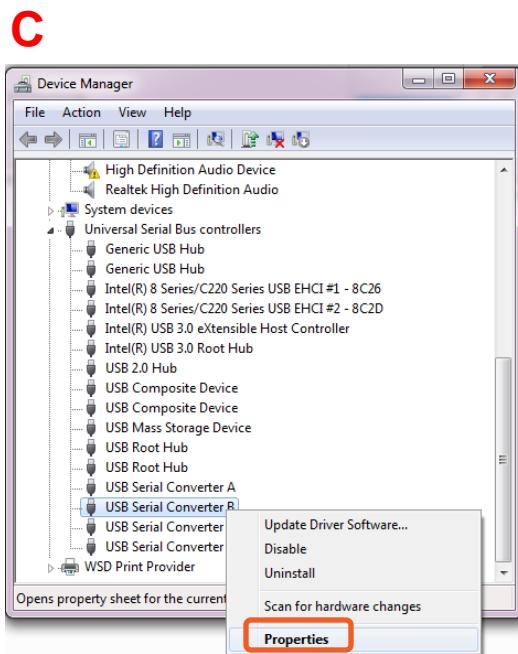
- Run the Device Manager: Press [Windows Key] + R; type *devmgmt.msc*; click “OK”.
- Go to Universal Serial Bus Controllers.



INSTALL HARDWARE & SOFTWARE (3/8)

STEP 6 – Verify driver installation - continued:

- C. Right-click on one of the USB Serial Converters; click **Properties**.
- D. Go to “Driver”; check if **FTDI Driver v2.12.0.0** or later is installed → **Correct Driver has been installed!**
- E. Go to “Advanced”; make sure **Load VCP** is checked.
- F. Repeat for the other USB Serial converters. Skip to STEP 9 if correct driver is installed for all USB Serial Converters.



INSTALL HARDWARE & SOFTWARE (4/8)

STEP 7 – Download the FTDI Driver:

- Go to <http://www.ftdichip.com/Drivers/VCP.htm>.
- Download the latest Windows “setup executable”.

A

B

Currently Supported VCP Drivers:

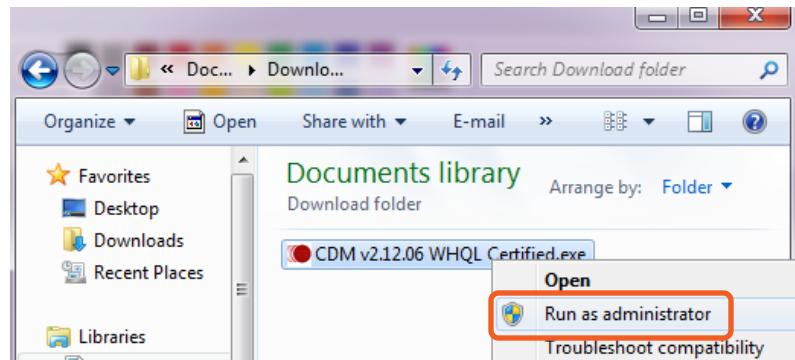
		Processor Architecture								
Operating System	Release Date	x86 (32-bit)	x64 (64-bit)	PPC	ARM	MIPSII	MIPSIV	SH4	Comments	
Windows*	2015-07-28	2.12.06	2.12.06	-	-	-	-	-	2.12.06 WHQL Certified Available as <u>setup executable</u> Release Notes	
Linux	2009-05-14	1.5.0	1.5.0	-	-	-	-	-	All FTDI devices now supported in Ubuntu 11.10, kernel 3.0.0-19 Refer to TN-101 if you need a custom VCP VID/PID in Linux	
Mac OS X 10.3 to 10.8	2012-08-10	2.2.18	2.2.18	2.2.18	-	-	-	-	Refer to TN-105 if you need a custom VCP VID/PID in MAC OS	
Mac OS X 10.9 and above	2015-04-15	-	2.3	-	-	-	-	-	This driver is signed by Apple	
Windows CE 4.2-5.2**	2012-01-06	1.1.0.20	-	-	1.1.0.20	1.1.0.10	1.1.0.10	1.1.0.10		
		1.1.0.20			1.1.0.20					

INSTALL HARDWARE & SOFTWARE (5/8)

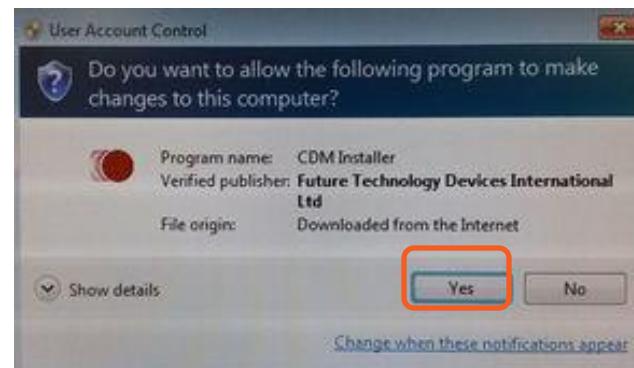
STEP 8 – Manual Driver installation:

Right-click the downloaded file;

“Run as administrator”:



Press “Yes” if this screen is shown:

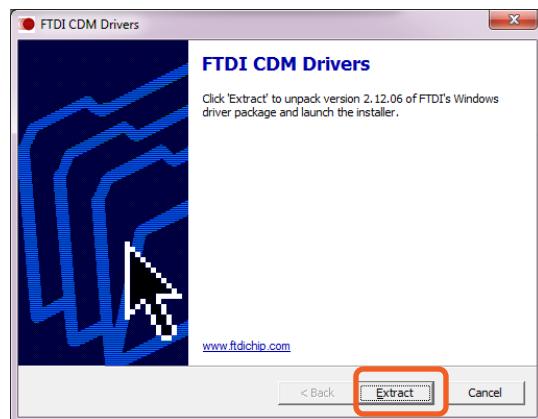


N.B. If a security warning pops up, click “Run”.

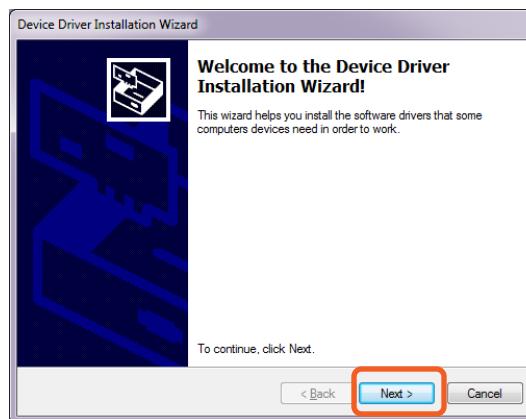
INSTALL HARDWARE & SOFTWARE (6/8)

STEP 8 – Manual Driver installation - continued:

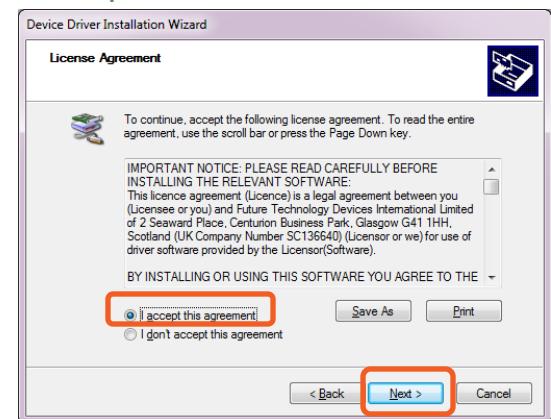
Click “Extract”:



Click “Next”:



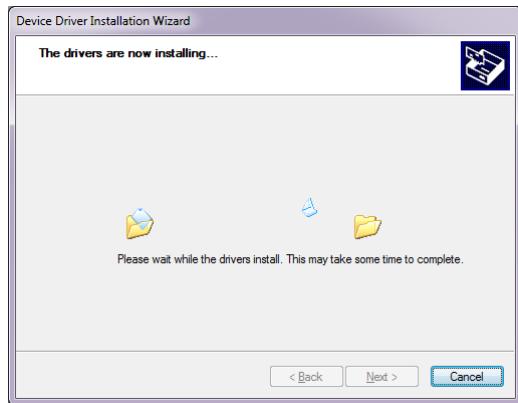
Accept and click “Next”:



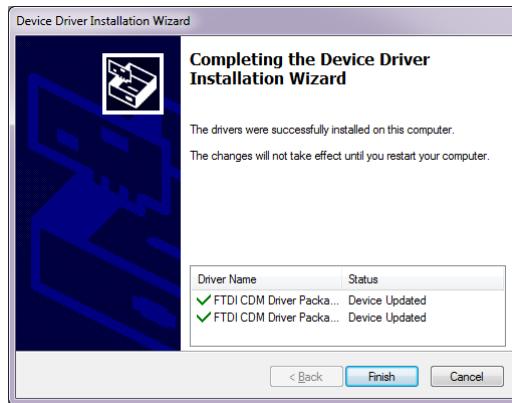
INSTALL HARDWARE & SOFTWARE (7/8)

STEP 8 – Manual Driver installation - continued:

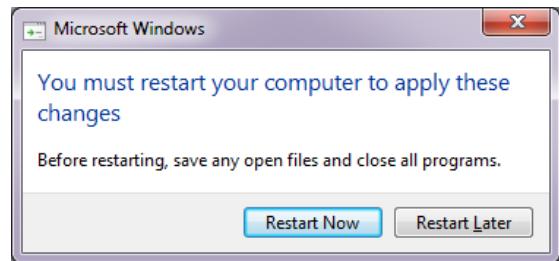
Drivers are installing:



Click "Finish":



Click "Restart Now":



N.B. Repeat STEP 6 before proceeding!

INSTALL HARDWARE & SOFTWARE (8/8)

N.B. Only continue with STEP 9 if the driver installation has been verified (STEP 6).

STEP 9 – Extract the zip-file downloaded at STEP 1.

STEP 10 – Double-click “*setup.exe*” and follow the instructions.

STEP 11 – When the installation is complete, double-click the *Consensys* desktop icon to start.

LICENSING - OVERVIEW (1/3)

N.B. ConsensysPRO requires a license to utilize the software, skip this licensing section if you intend to only use ConsensysBASIC for which a license is not required.

Subscription: Subscription license permits the use of ConsensysPRO for a specified time period after which time the subscription must be renewed in order to use the application. ConsensysPRO implements an annual subscription (365 day period).

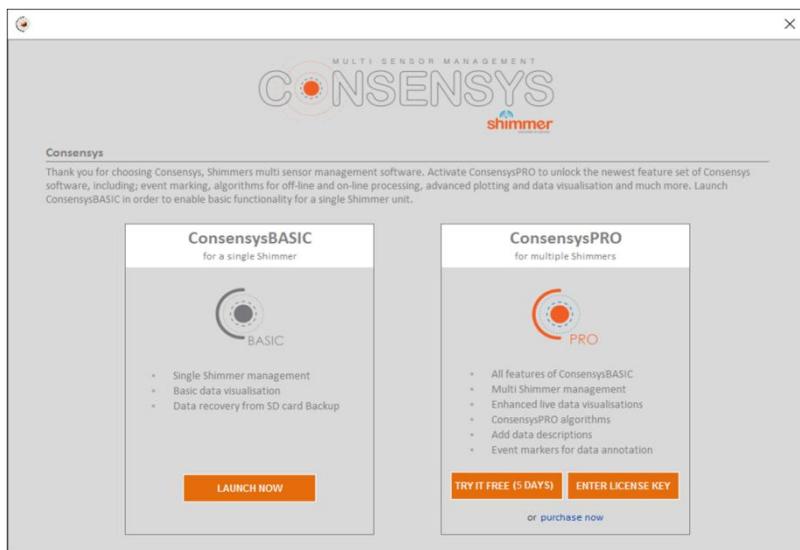
Floating: Floating licensing authorizes the use of ConsensysPRO with the given number of activations. The number of concurrent activations is tracked, and the total number of running sessions of the licensed application at any time is limited by the maximum allowed activations in the floating licenses purchased by the licensee.

Trial: You can try ConsensysPRO free of charge for a 5 day period after which you must purchase a license to continue to use ConsensysPRO or use ConsensysBASIC.

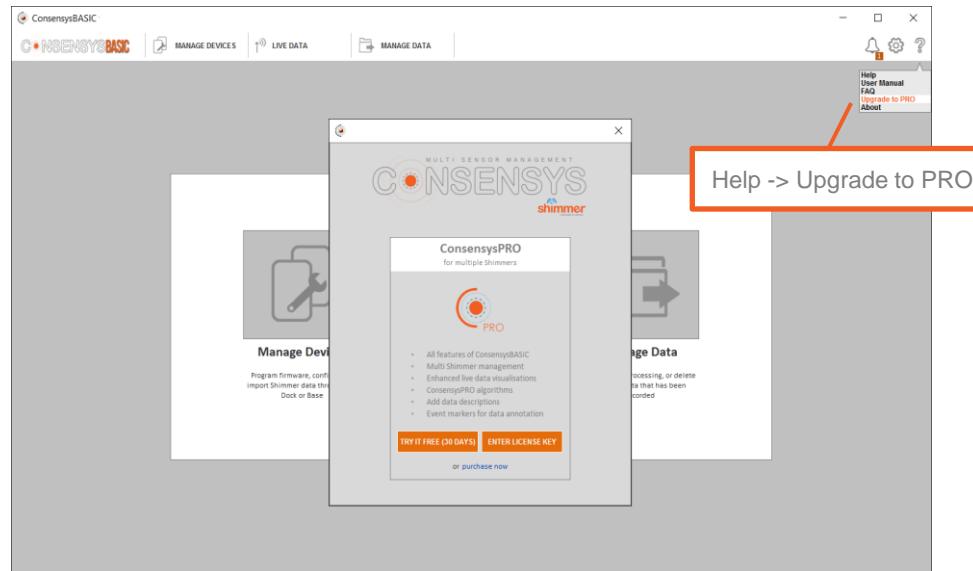
LICENSING - ACTIVATION (2/3)

N.B. ConsensysPRO requires a license to utilize the software, skip this licensing section if you intend to only use ConsensysBASIC for which a license is not required.

(A) Activate ConsensysPRO on software startup

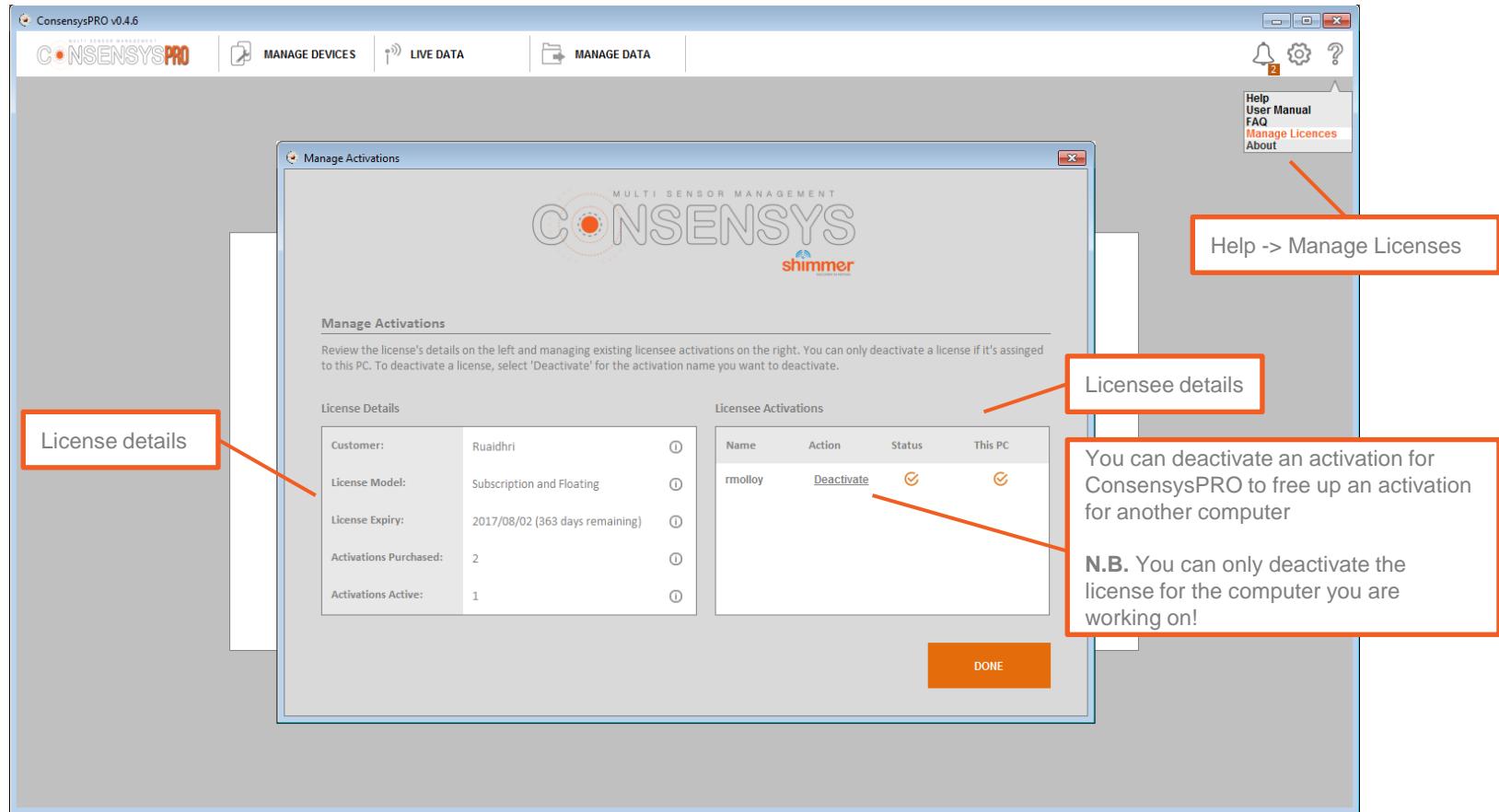


(B) Activate ConsensysPRO by selecting Help -> Upgrade to PRO



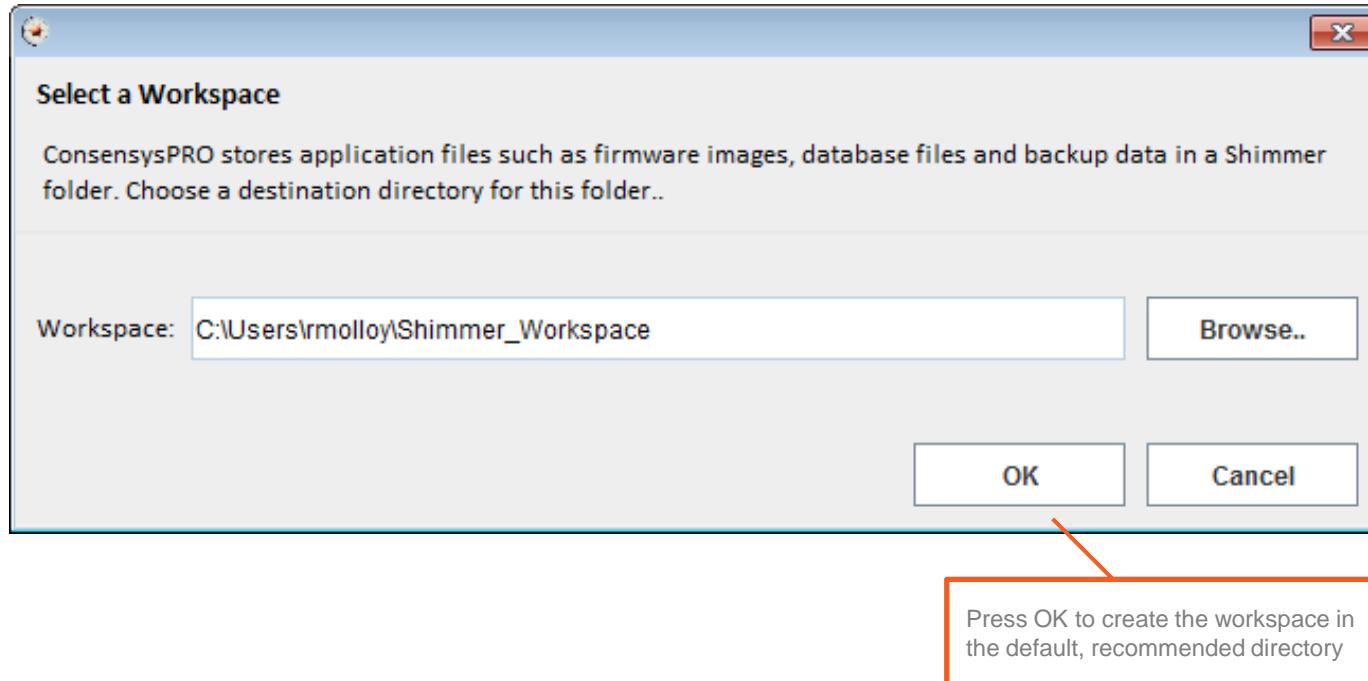
N.B. You can trial ConsensysPRO for free for a 5 day period or you can purchase a license by visiting <http://www.shimmersensing.com/menu/products/consensys>

LICENSING - MANAGEMENT (3/3)

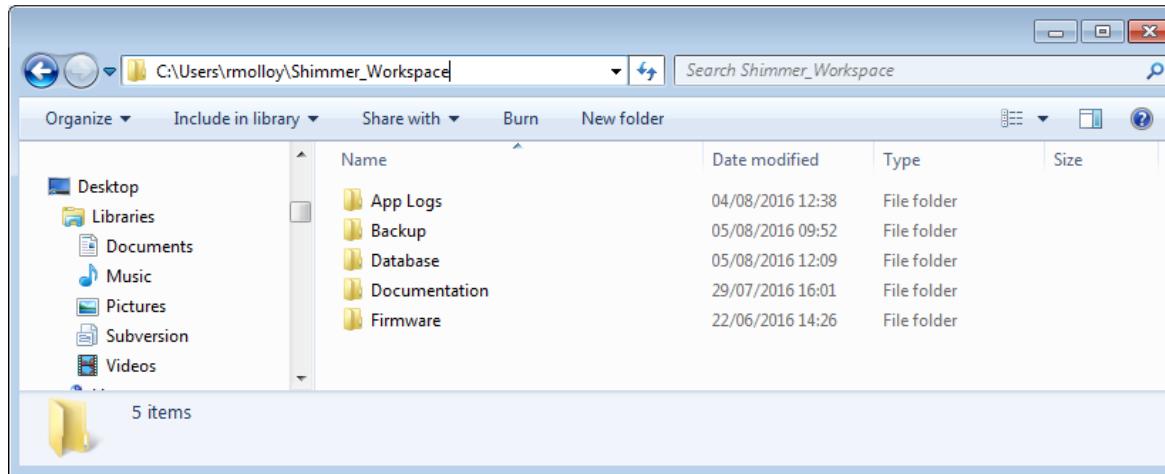


CONSENSYS WORKSPACE (1/2)

N.B. The first time a new version of Consensys software is run, a workspace must be created to store application files. The workspace will be created automatically when you choose a directory and press the 'OK' button. The structure of the workspace is detailed on the next slide.



CONSENSYS WORKSPACE (2/2)



App Logs: Contains text files with debug information used by the Shimmer team to debug Consensys hardware and/or software issues.

Backup: Contains a back up of the data imported from Shimmer SD cards into Consensys software.

Database: Contains database files with data imported from Shimmer SD cards and recorded over Bluetooth which can be exported to text files in Consensys software (using the MANAGE DATA tab).

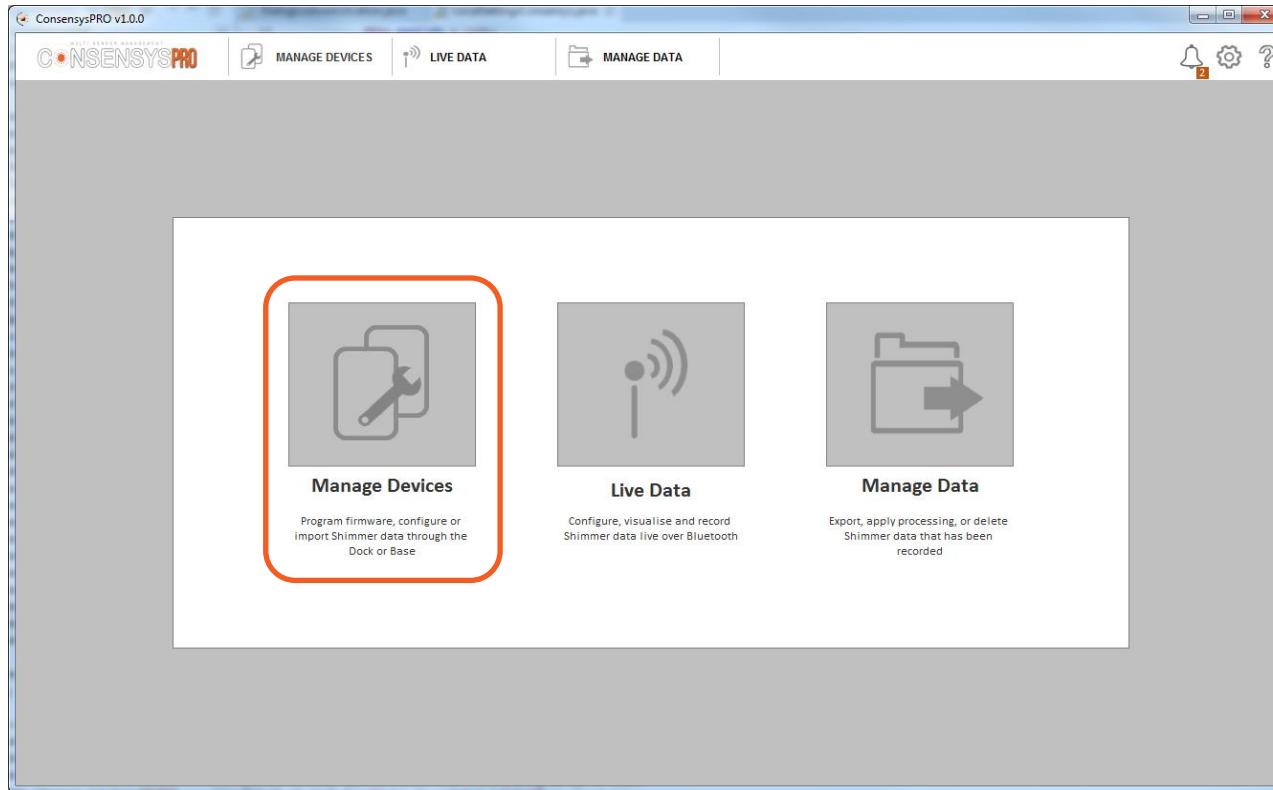
Documentation: Contains this user guide and a FAQ document (both accessible in Consensys software through the help icon)

Firmware: Contains Shimmer3 firmware files (e.g. LogAndStream, SDLog) which can be programmed onto Shimmers in Consensys software.

PROGRAM FIRMWARE (1/3)

STEP 1 – Start *ConsenSys*.

STEP 2 – Click “MANAGE DEVICES”.

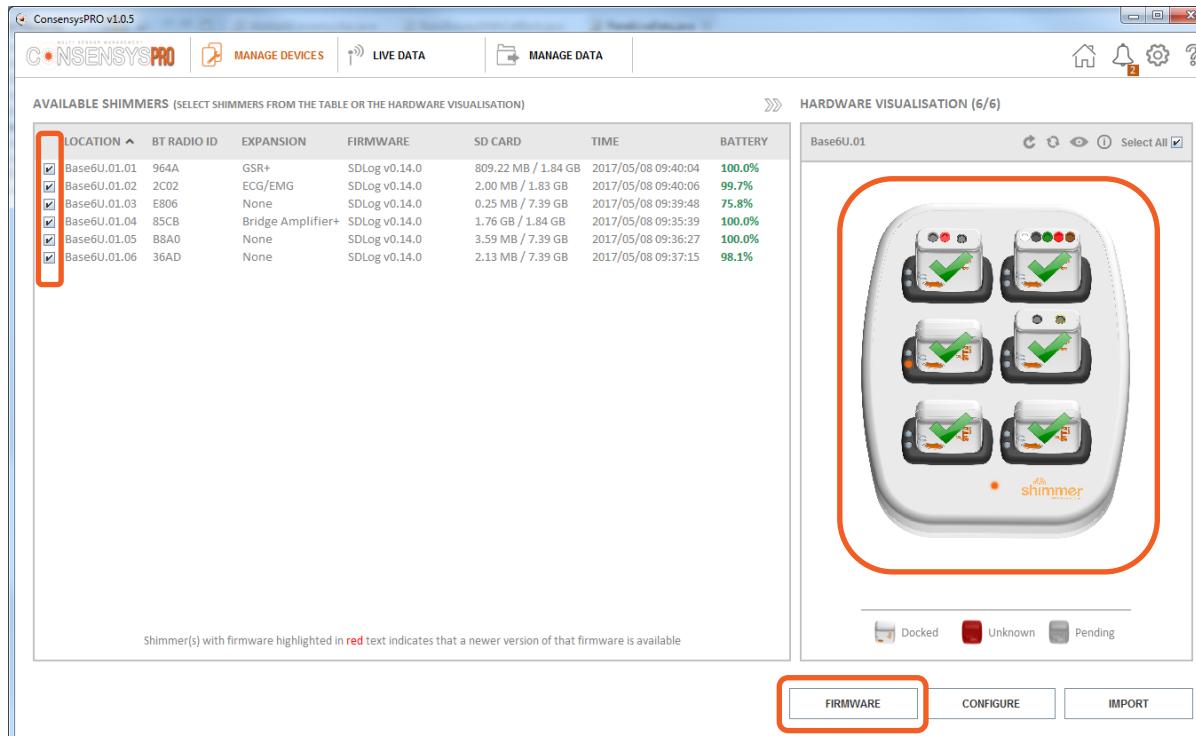


PROGRAM FIRMWARE (2/3)

STEP 3 – Switch on the Shimmer(s) and place in the *Base6*.

STEP 4 – Click on the graphic or the device list to select/deselect the Shimmer(s).

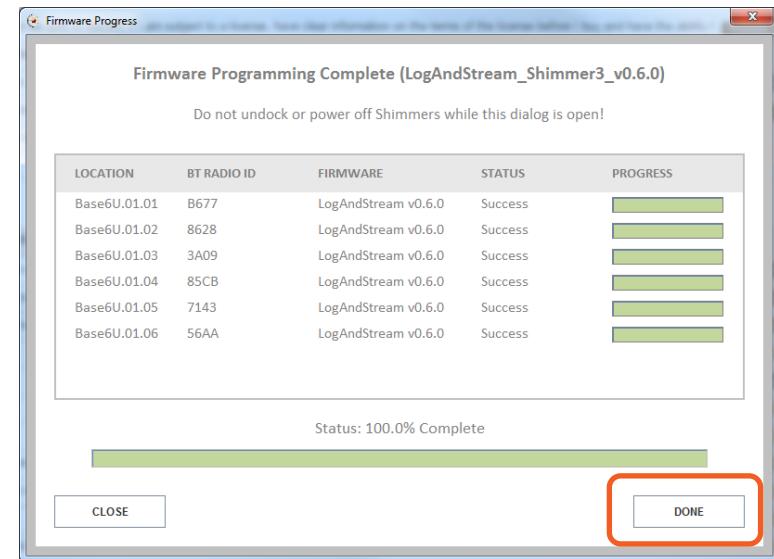
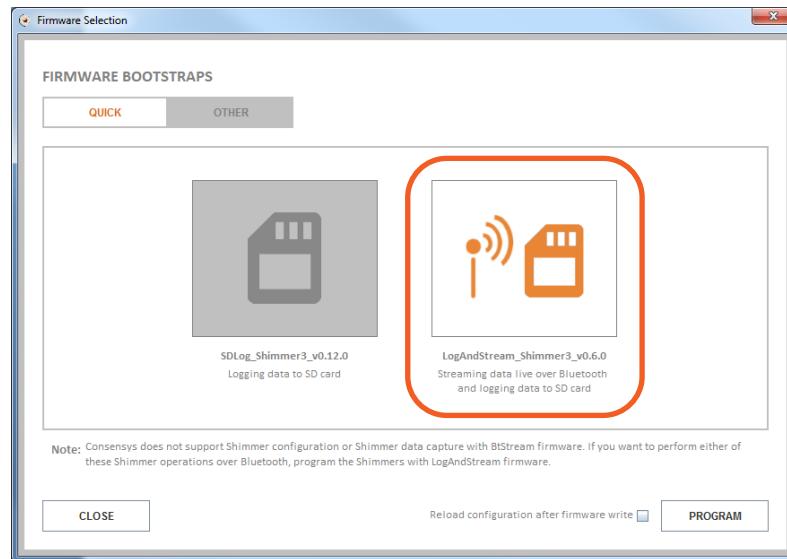
STEP 5 – Select one or more Shimmers and click on the “FIRMWARE” button.



PROGRAM FIRMWARE (3/3)

STEP 6 – Program the Shimmer with *SDLog* or *LogAndStream*:

Select *SDLog* or *LogAndStream*, and click PROGRAM": Click "DONE" when complete:



LOGGING

Logging data on the SD card(s) of one or multiple Shimmers.

In this section:

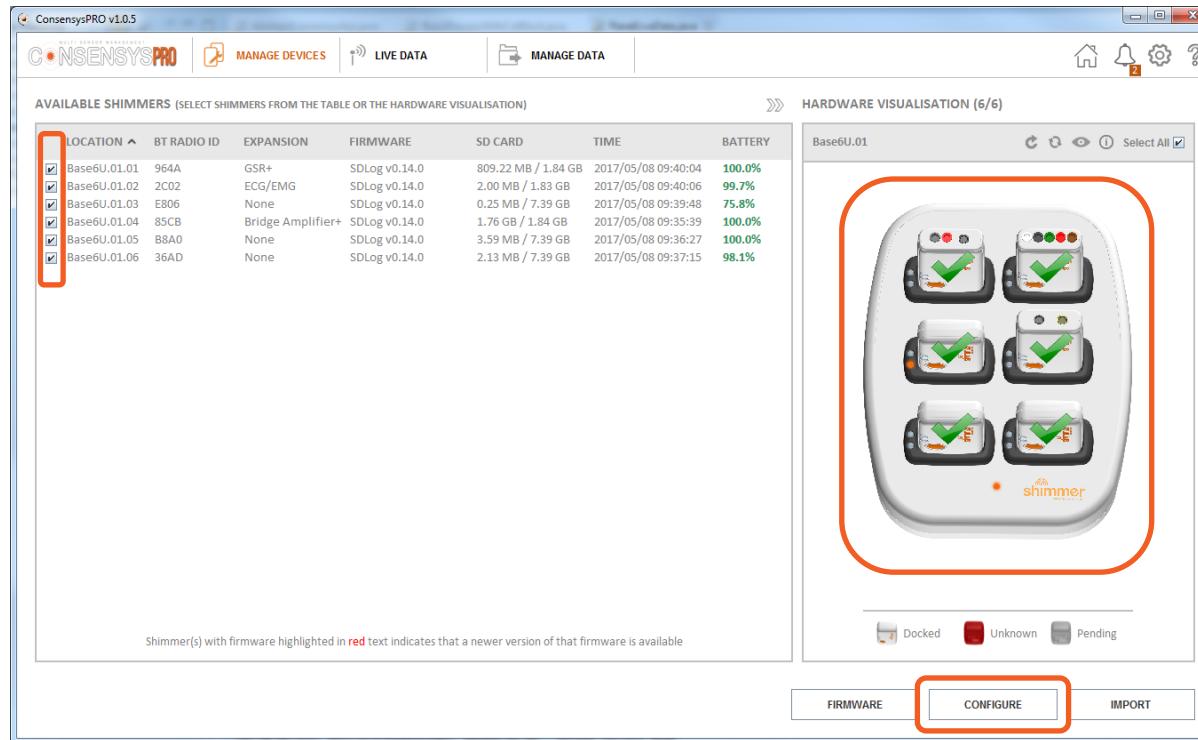
- [Configure Trial](#)
- [Capture Data](#)
- [Import Data](#)

N.B. To enable logging data to the SD cards Shimmers need to be programmed with *SDLog* or *LogAndStream* firmware – see [Program Firmware](#).

N.B. In the Logging section of this guide *SDLog* is used, which allows for synchronisation between multiple Shimmers when logging to the SD card. Synchronisation is not available for *LogAndStream*. The advantage of *LogAndStream* is that it can also be used to stream data over Bluetooth – see the [Streaming section](#) of this guide.

LOGGING – CONFIGURE TRIAL (1/8)

STEP 1 – Select one or more Shimmer(s) with the same firmware (type and version) and click on “CONFIGURE”:



N.B. ConsensysBASIC only allows the use of one Shimmer at any one time!

LOGGING – CONFIGURE TRIAL (2/8)

STEP 2 – Set TRIAL NAME & Sync Devices:

- Choose a TRIAL NAME.
- Click the *Sync Devices* tile to enable synchronised logging from multiple Shimmers (available for *SDLog* firmware only).
- Choose Mode based on estimated logging duration.

A Sync Devices

B AVAILABLE SHIMMERS

LOCATION	BT RADIO ID	EXPANSION	SHIMMER NAME
Base6U.01.01	964A	GSR+	Shimmer_964A
Base6U.01.02	2C02	ECG/EMG	Shimmer_2C02
Base6U.01.03	E806	None	Shimmer_E806
Base6U.01.04	85CB	Bridge Amplifier+	Shimmer_85CB
Base6U.01.05	B8A0	None	Shimmer_B8A0
Base6U.01.06	36AD	None	Shimmer_36AD

Master Shimmer shown in orange text, only applicable when sync devices enabled.

SENSORS

- Low-Noise Accelerometer
- Wide-Range Accelerometer
- Gyroscope
- Magnetometer
- Pressure & Temperature
- Battery Voltage
- External Expansion ADCs
- Internal Expansion ADCs
- GSR+ PPG

ALGORITHMS

CALIBRATION

LIVE DATA

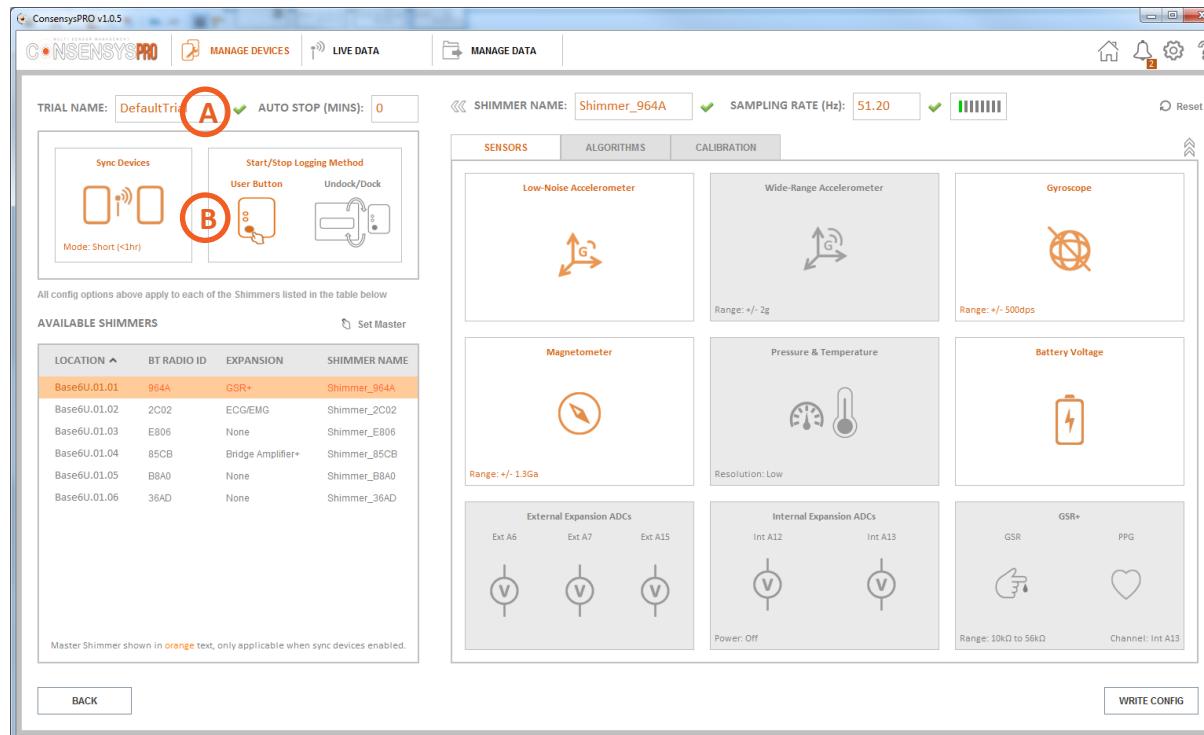
MANAGE DATA

WRITE CONFIG

LOGGING – CONFIGURE TRIAL (3/8)

STEP 3 – Set AUTO STOP & Start/Stop Logging Method:

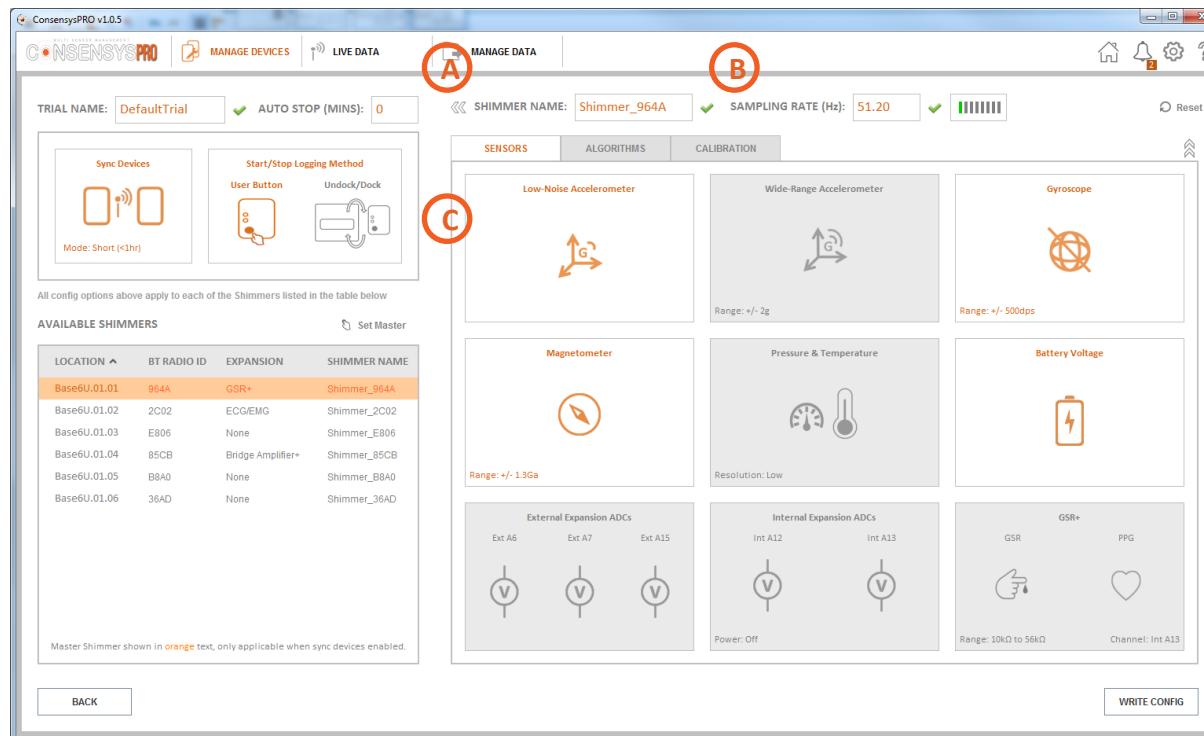
- To automatically stop logging, enter a value other than zero.
- Choose to start and stop logging with the User Button or by undocking/docking – User Button is used in this guide.
N.B. When using the Undock/Dock method, log for at least one minute to ensure a data file is created.



LOGGING – CONFIGURE TRIAL (4/8)

STEP 4 – Set parameters for **each** Shimmer.

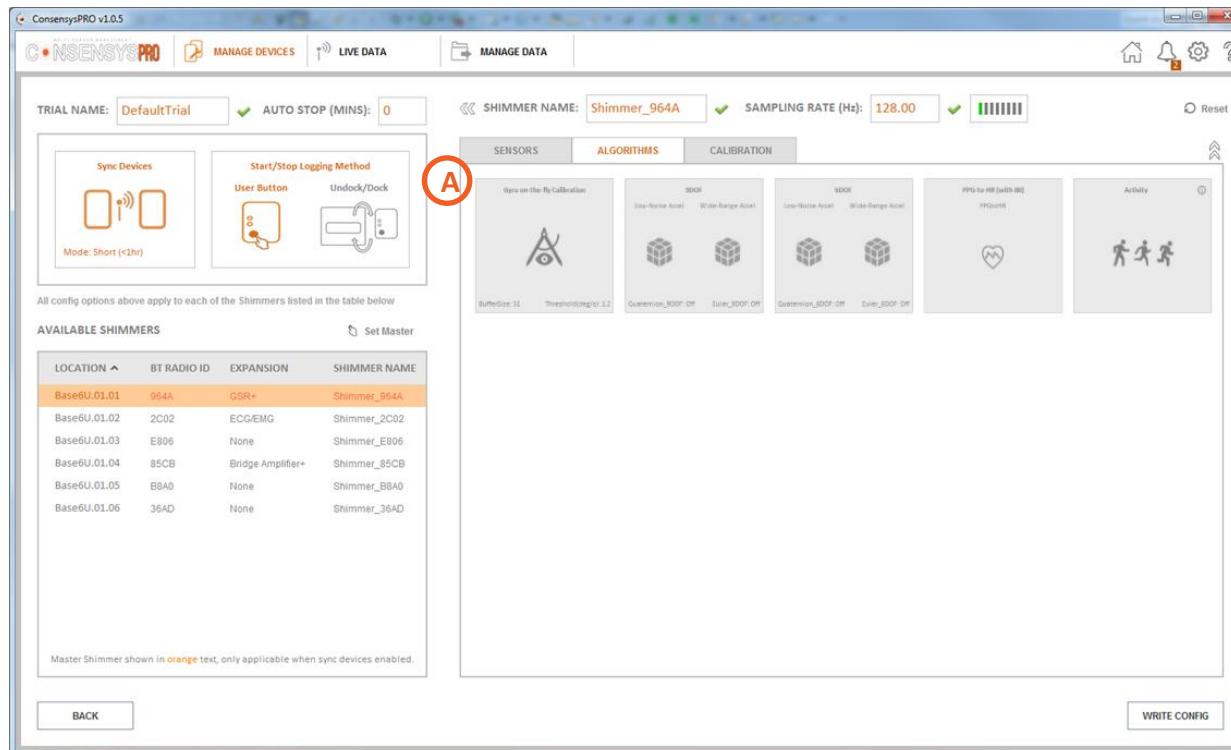
- Choose SHIMMER NAME.
- Choose SAMPLING RATE.
- Click on the tiles to enable and configure sensors.



LOGGING – CONFIGURE TRIAL (5/8)

STEP 5 – Set algorithms for each Shimmer

- A. Enabled algorithms specific to the hardware (e.g. 9DoF to Quat for Shimmer3 IMU, ECG-to-HR for Shimmer3 ECG etc)



N.B. Algorithms are not available in ConsensysBASIC!

LOGGING – CONFIGURE TRIAL (6/8)

STEP 6 – Review calibration for each Shimmer.

- A. Review the calibration for each of the IMU sensors. You can reset the calibration of all or an individual IMU to the factory default calibration by pressing the reset icon

The screenshot shows the ConsensysPRO v1.0.5 software interface. At the top, there are tabs for 'TRIAL NAME' (DefaultTrial), 'MANAGE DEVICES', 'LIVE DATA', and 'MANAGE DATA'. Below these are sections for 'Sync Devices' (Mode: Short <1hr) and 'Start/Stop Logging Method' (User Button, Undock/Dock). The main area has tabs for 'SENSORS', 'ALGORITHMS', and 'CALIBRATION'. Under 'CALIBRATION', there is a section titled 'IMU Calibration Parameters Review' with four sub-sections: 'Low-Noise Accelerometer', 'Gyroscope', 'Wide-Range Accelerometer', and 'Magnetometer'. Each sub-section contains tables for 'Offset (lx)', 'Sensitivity (Kx)', and 'Alignment (Rx)'. To the right of these tables is a 'Calibration Review Color Code' section with two status indicators: 'Custom Calibration' (green) and 'Invalid Calibration' (red). Below the calibration tables is an 'IMU Calibration Formula' section with the equation $c = Rx^{-1} \cdot Kx^{-1} \cdot (ux - bx)$. A legend defines the symbols: c = 3x1 calibrated signal vector, Rx = 3x3 alignment matrix, Kx = 3x3 sensitivity matrix, ux = 3x1 uncalibrated signal vector, bx = 3x1 offset vector. A red box with an arrow points to the 'Reset all to factory default calibration' button, which is located in the 'IMU Calibration Parameters Review' section. Another red box with an arrow points to the 'Reset individual IMU to factory default calibration' button, which is located in the 'IMU Calibration Formula' section. A red circle labeled 'A' is positioned over the 'Sync Devices' section.

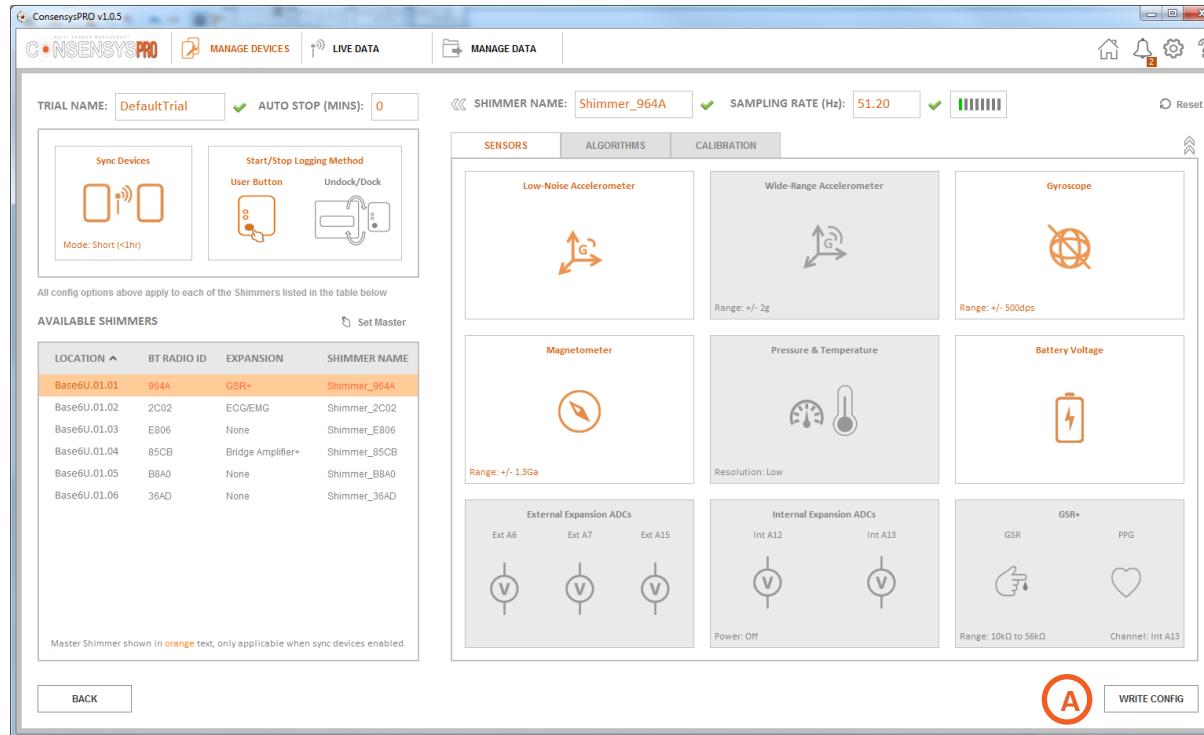
N.B. A Shimmer that appears with a red warning symbol has an invalid IMU calibration
And should be reset to default or calibrated using Shimmer's 9DoF calibration software



LOGGING – CONFIGURE TRIAL (7/8)

STEP 7 – Write settings for all Shimmer.

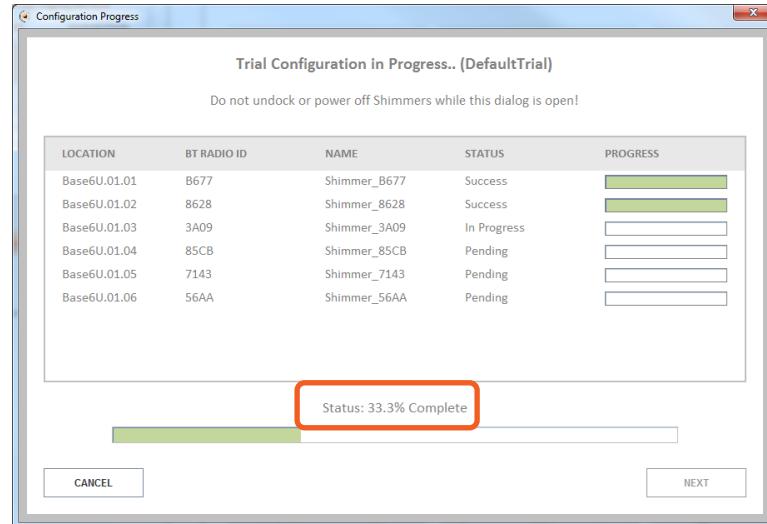
- Press the WRITE CONFIG button to save the configuration (trial details, Shimmer details, sensor details, algorithm details, calibration details) to each of the Shimmers.



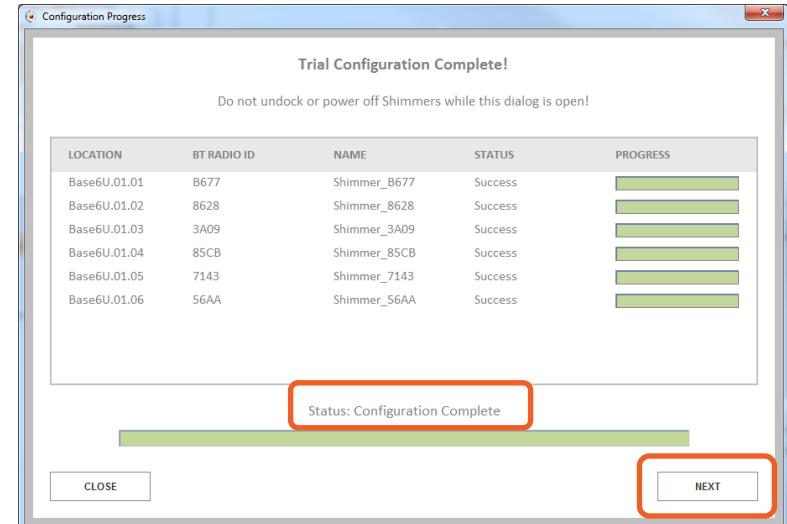
LOGGING – CONFIGURE TRIAL (8/8)

STEP 8 – WRITE CONFIG.

Wait until Trial Configuration is written:



Click “NEXT” to complete the configuration:



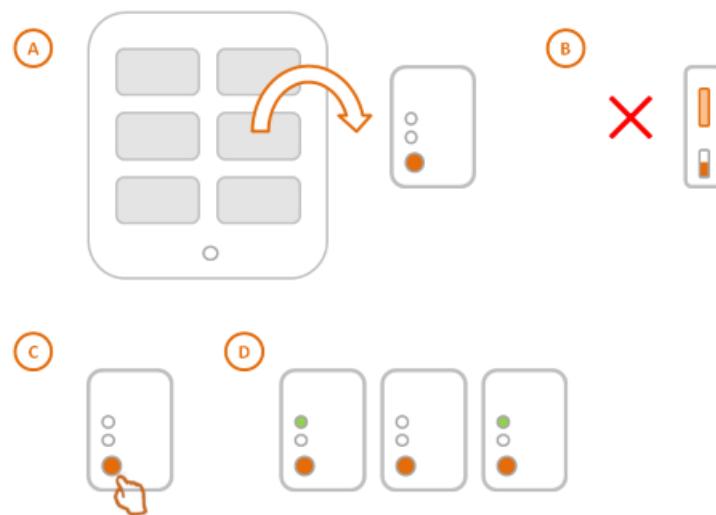
LOGGING – CAPTURE DATA (1/2)

STEP 1 – Undock the Shimmer(s). (A)

STEP 2 – DO NOT Power off the Shimmer. (B)

STEP 3 – Press the orange User Button on the Shimmer(s) to start data capture. (C)

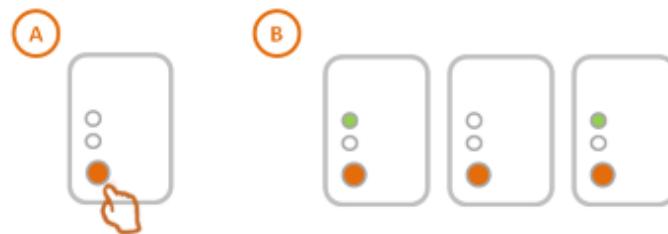
STEP 4 – The green LED will turn on and off at one second intervals when capturing data. (D)



LOGGING – CAPTURE DATA (2/2)

STEP 5 – Press the orange User Button again to stop data capture. (A)

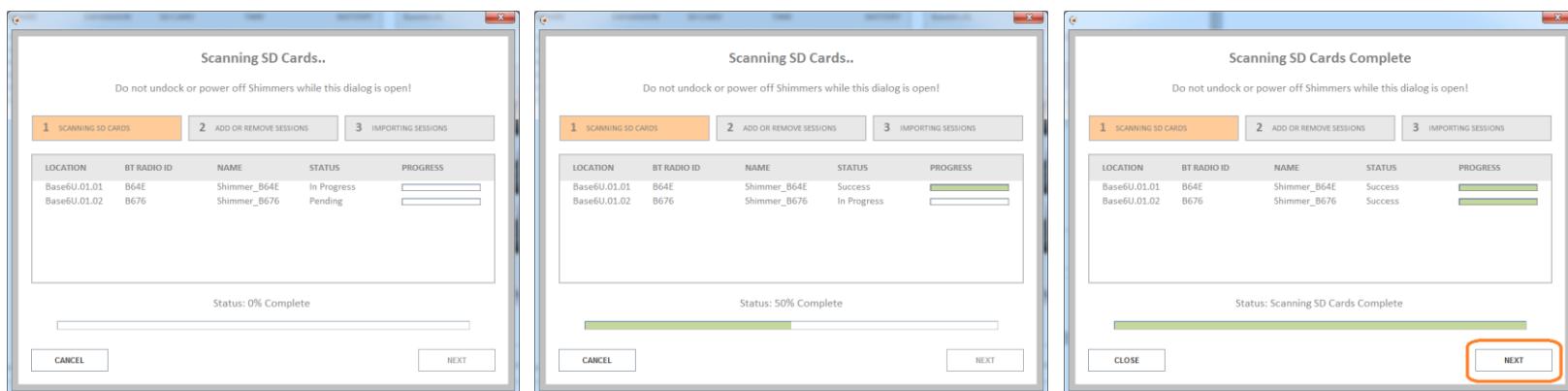
STEP 6 – The green LED will now turn on briefly once every two seconds. (B)



LOGGING – IMPORT DATA (1/6)

STEP 1 – Scanning SD Cards:

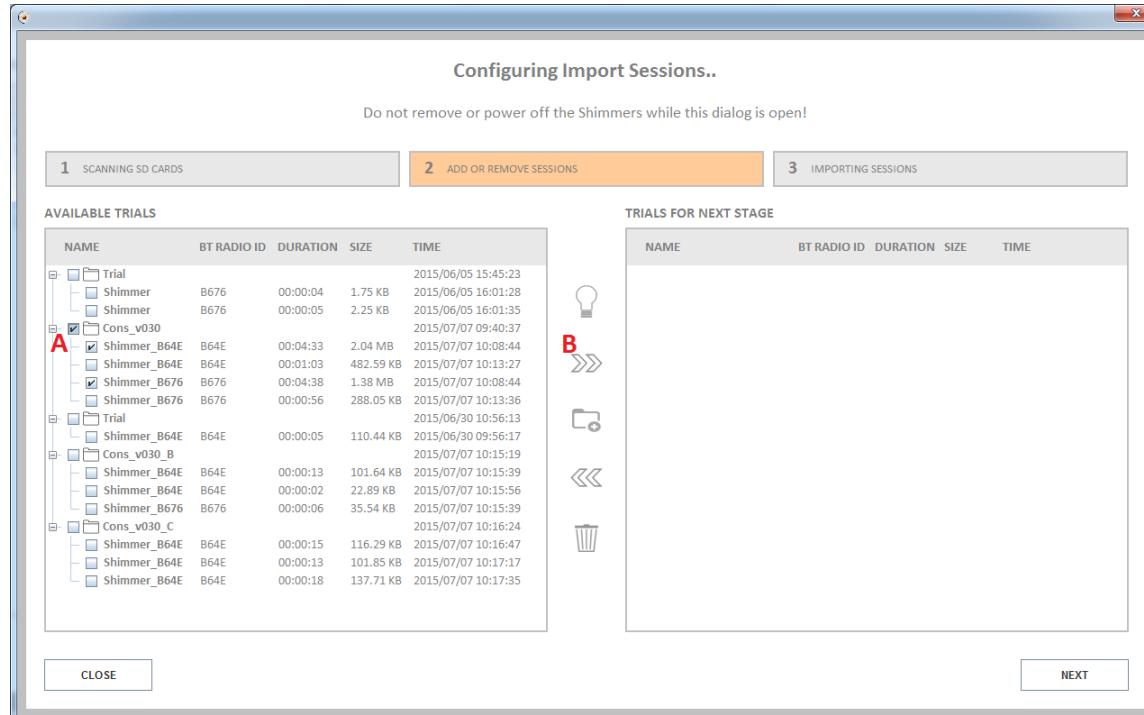
- A. Place the Shimmer(s) in the Base.
- B. Select the Shimmer(s) you want to import data from and click “IMPORT”.
- C. Hit “NEXT” when scanning is complete.



LOGGING – IMPORT DATA (2/6)

STEP 2 – Configuring Import Sessions:

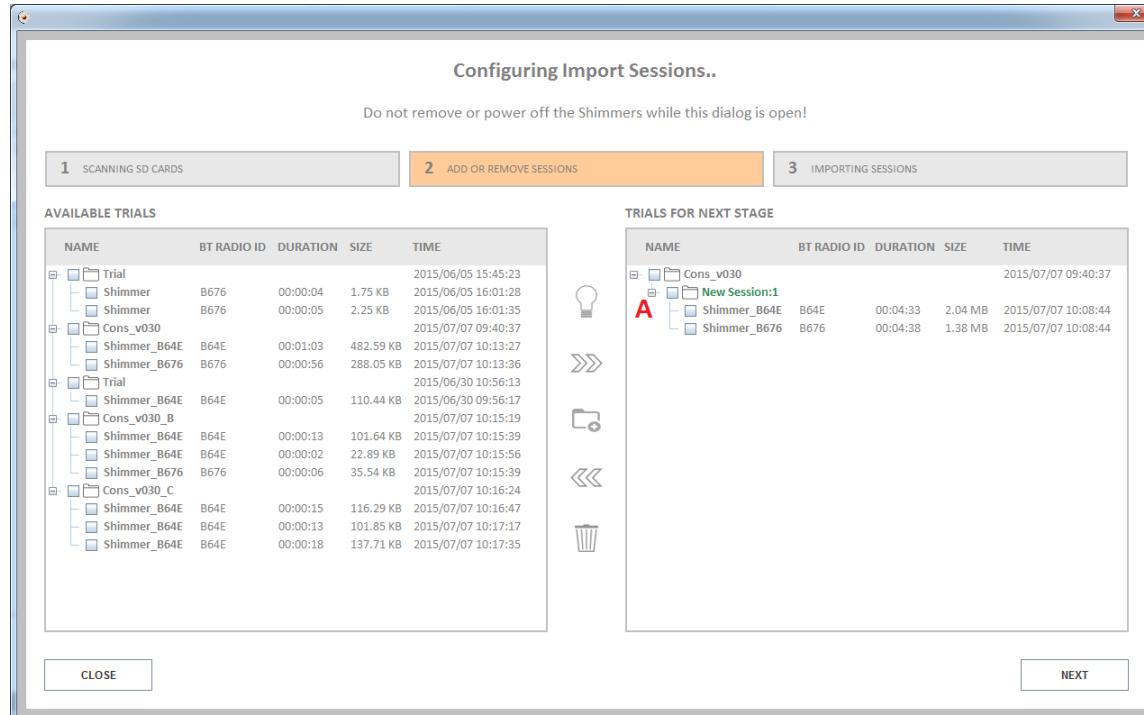
- A. Select data from one or more Shimmers.
- B. Click the button to add the data as new session to the list for the next stage.



LOGGING – IMPORT DATA (3/6)

STEP 2 – Configuring Import Sessions – continued:

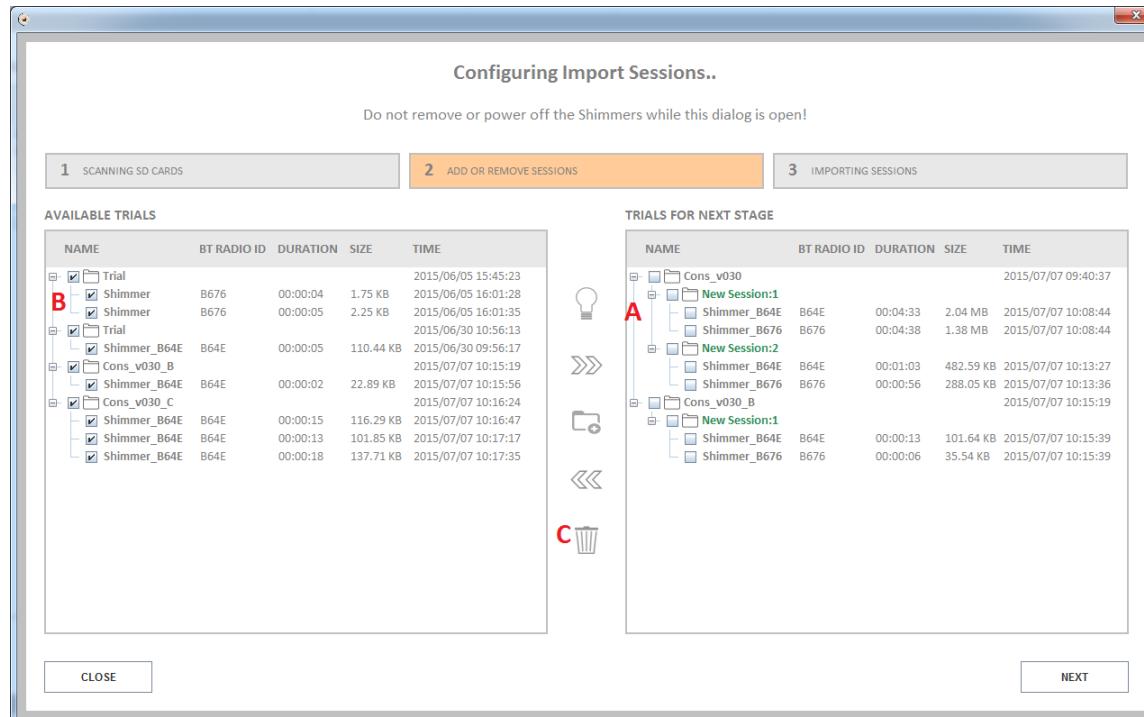
- A. For trial “Cons_v030” the data is added to “New Session:1”.



LOGGING – IMPORT DATA (4/6)

STEP 2 – Configuring Import Sessions – continued:

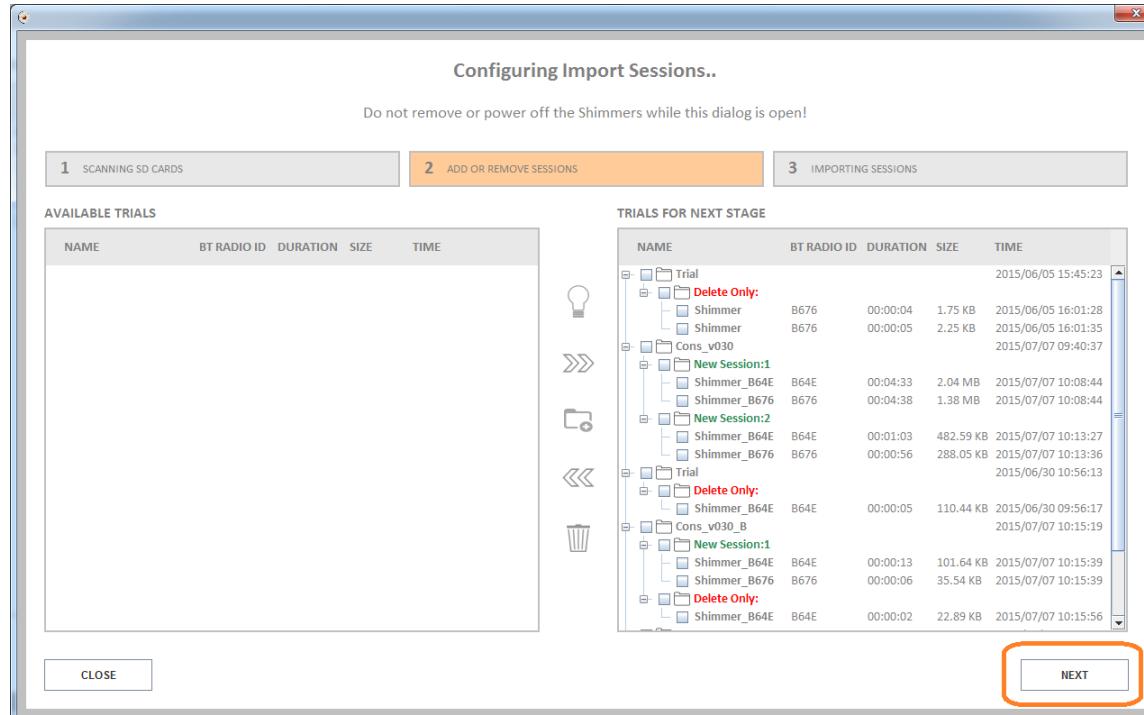
- A. In the same way data is added as “New Session:2” of trial “Cons_v030” and “New Session:1” of “Cons_v030_B”.
- B. The remaining data on the SD cards of the selected Shimmers is selected.
- C. Clicking this button will mark the data selected in AVAILABLE TRIALS (B) to be deleted in the next stage.



LOGGING – IMPORT DATA (5/6)

STEP 2 – Configuring Import Sessions – continued:

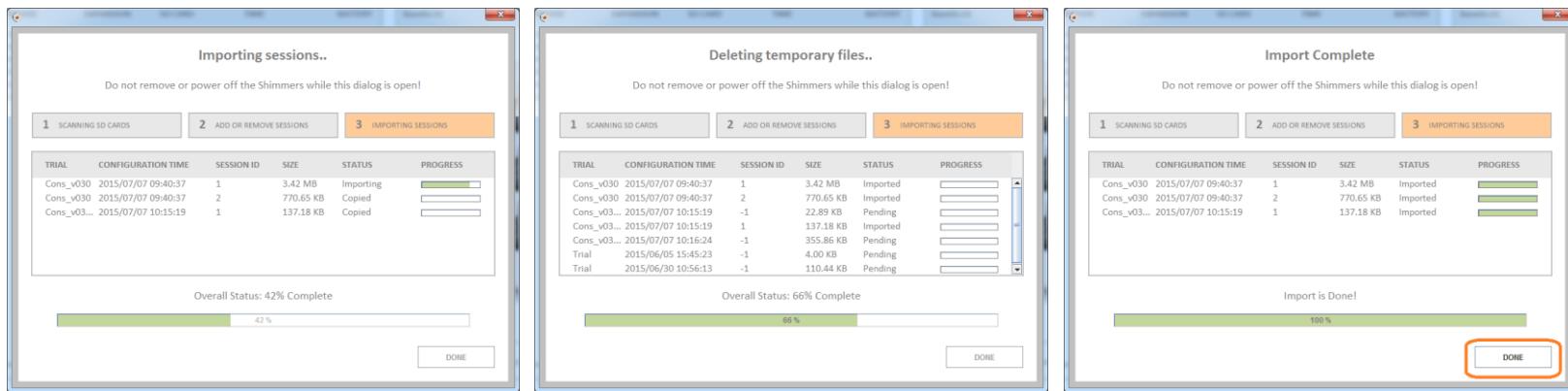
- A. Data not to be imported in the next stage is now listed to be deleted – marked “Delete Only”.
- B. Hit “NEXT” to continue to the next stage (and hit “YES” to confirm).



LOGGING – IMPORT DATA (6/6)

STEP 3 – Importing sessions:

- A. The data selected for import is now being imported into the database.
- B. Data marked to be deleted is now being deleted.
- C. Hit “DONE” when Import is complete to go to “MANAGE DATA”.



N.B. Skip to Manage Data for instructions on accessing the imported data.

STREAMING

Streaming data from one or multiple Shimmers to the computer over Bluetooth.

In this section:

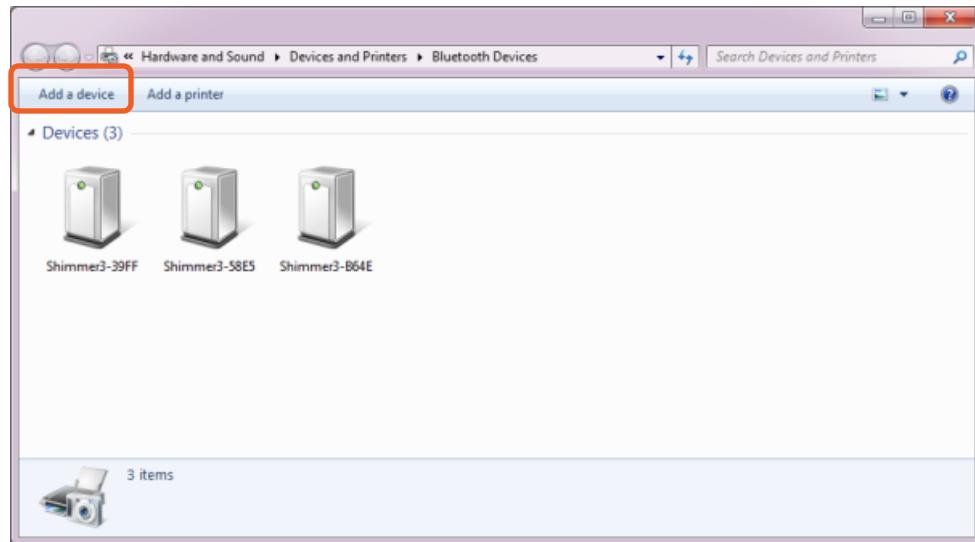
- [Pair Shimmer](#)
- [Connect](#)
- [Configure Trial](#)
- [Stream & Plot](#)
- [Record](#)

N.B. The computer needs to be equipped with a Bluetooth Adapter to allow streaming over Bluetooth.

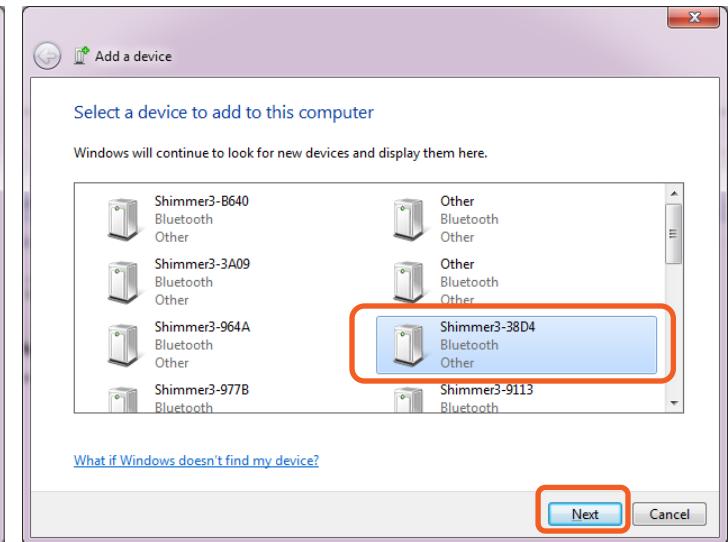
N.B. Shimmers need to be programmed with *LogAndStream* firmware - see [Program Firmware](#).
BtStream firmware is not supported in *Consensys software*.

STREAMING – PAIR SHIMMER (1/2)

Click “Add a device” in Bluetooth devices in Control Panel:

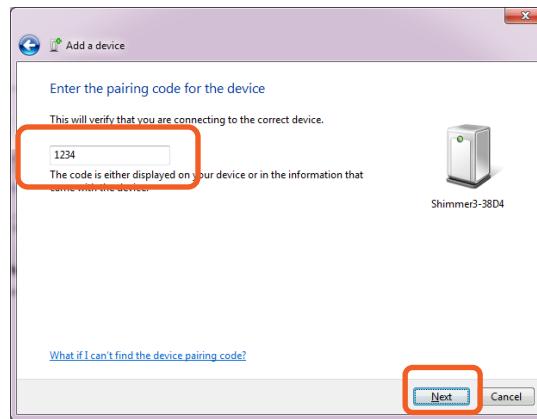
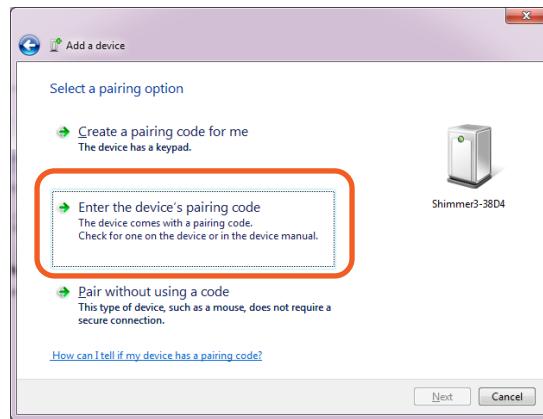


Select Shimmer, click “Next”:

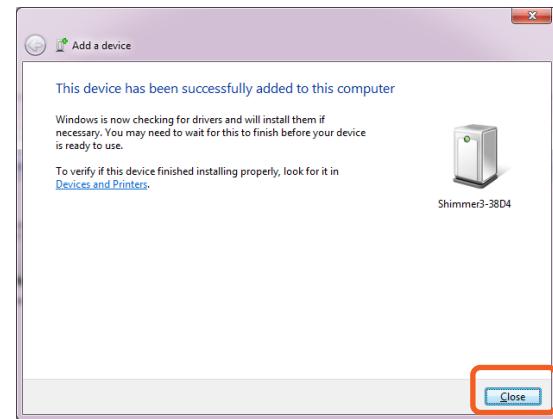


STREAMING – PAIR SHIMMER (2/2)

Enter the pairing code: “1234” and click “Next”:

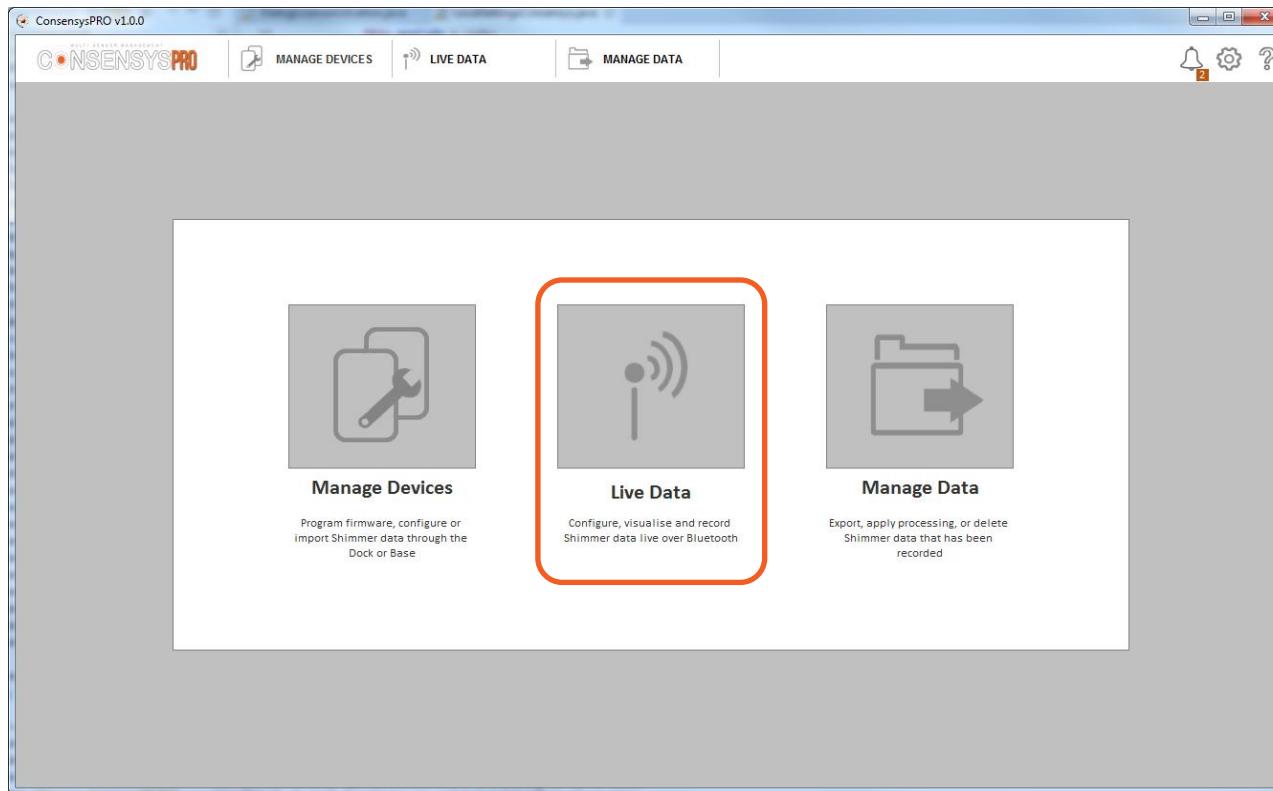


Click “Close”:



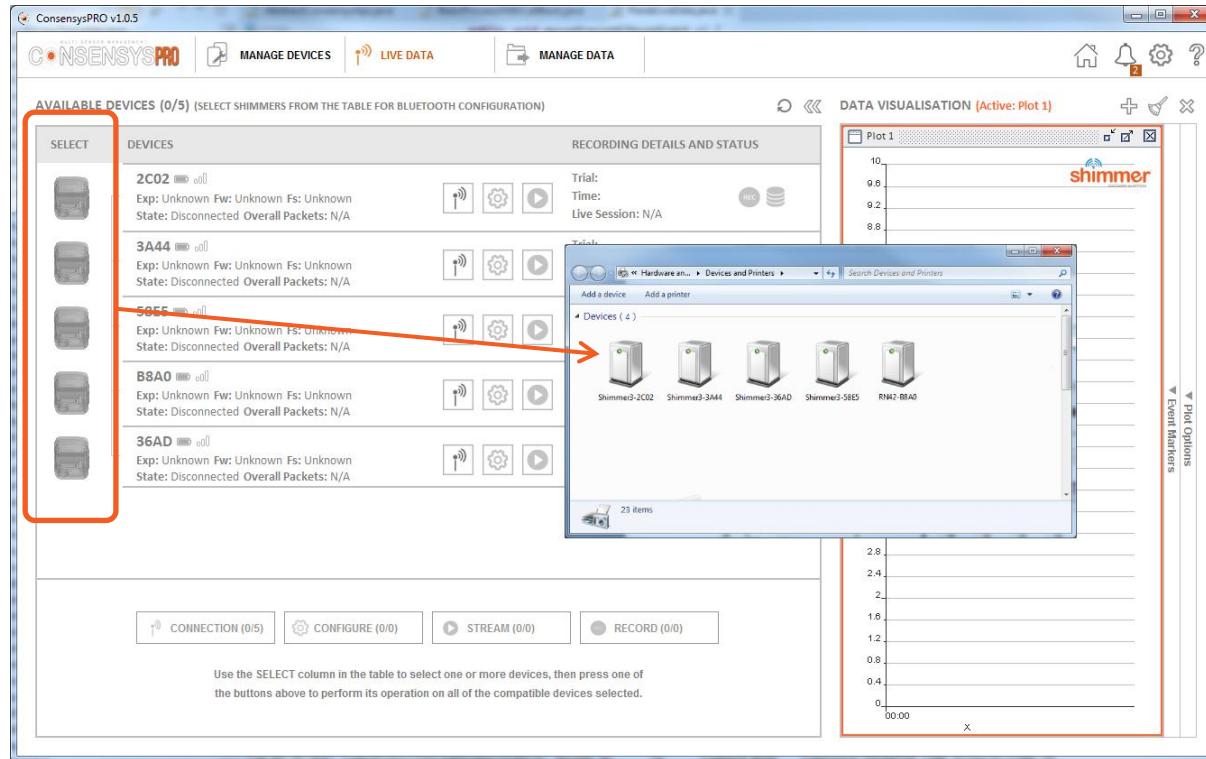
STREAMING – CONNECT (1/5)

STEP 1 – Go to “LIVE DATA”:



STREAMING – CONNECT (2/5)

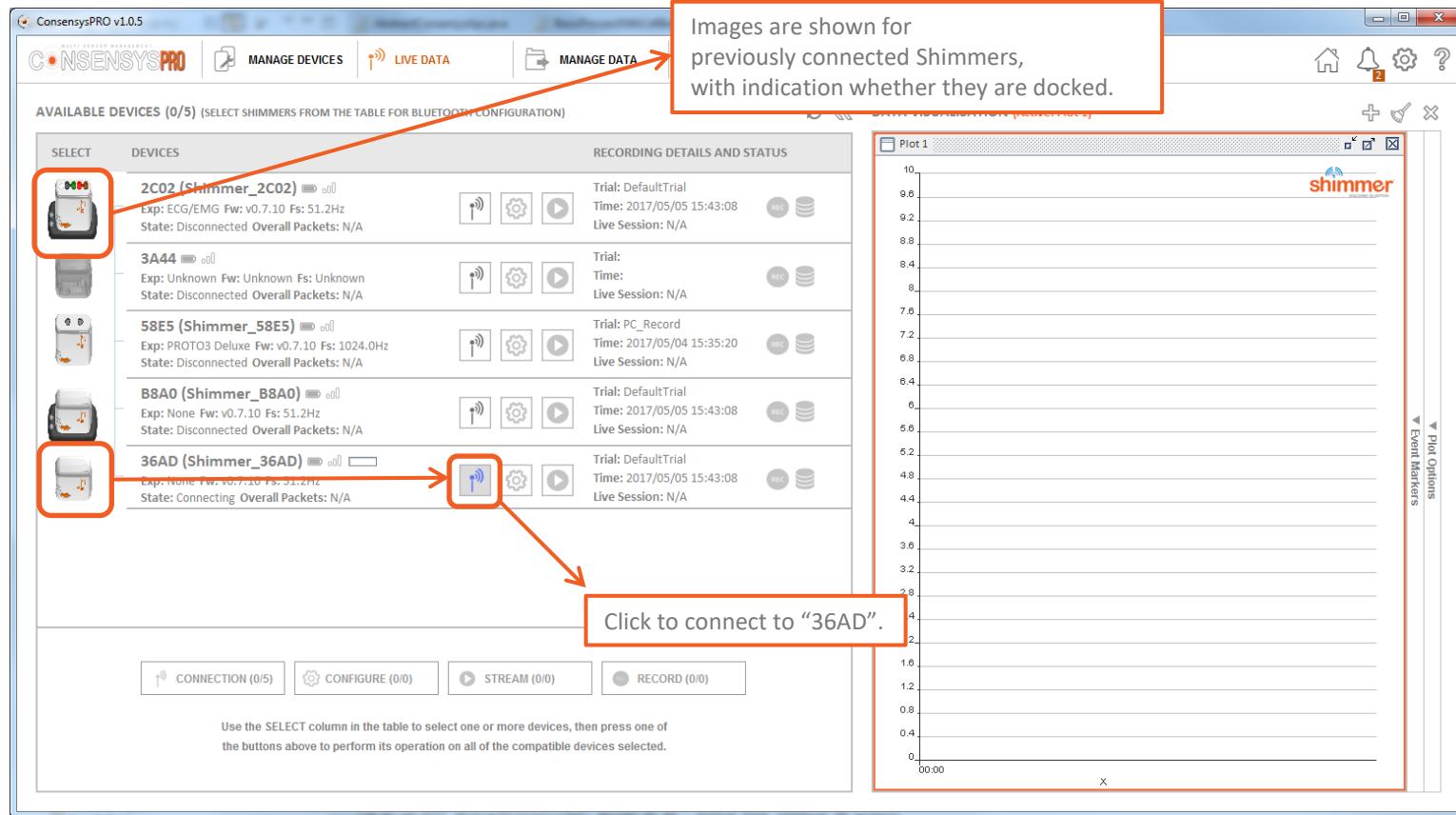
STEP 2 – Note all Shimmers listed in “Devices and Printers” show up in “LIVE DATA” :



N.B. ConsensysBASIC only allows the use of one Shimmer at any one time!

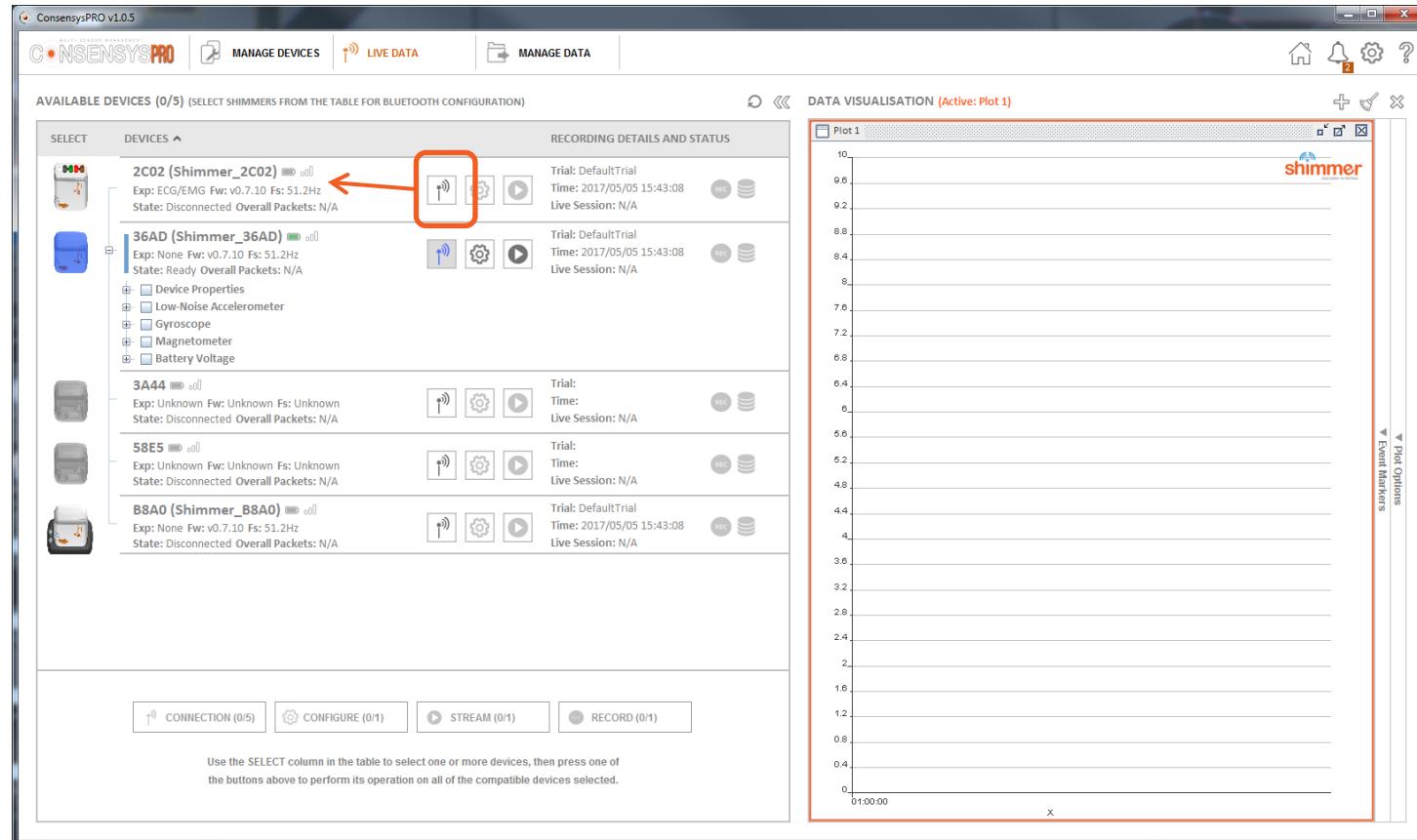
STREAMING – CONNECT (3/5)

STEP 3 – Connect to Shimmer (“36AD” in this example):



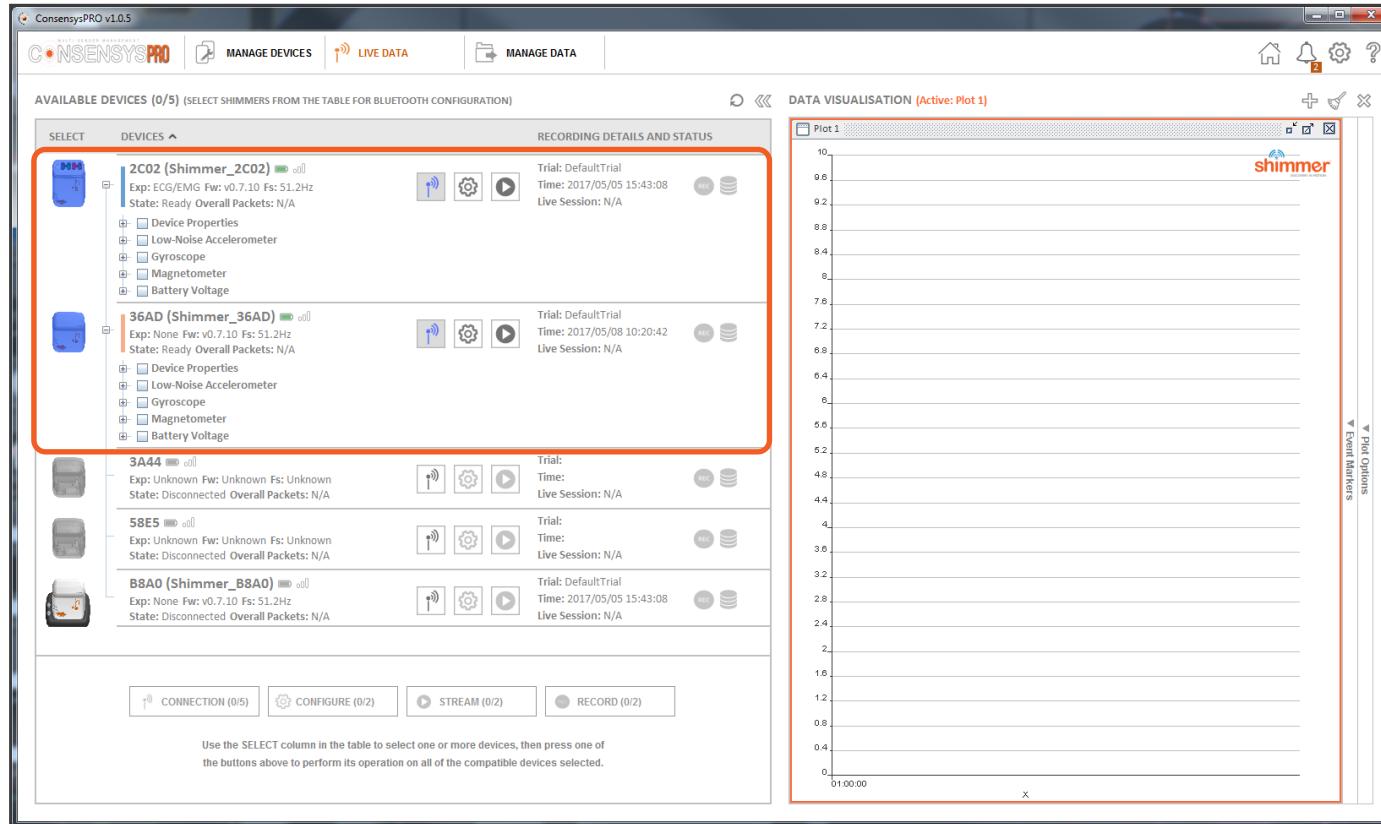
STREAMING – CONNECT (4/5)

STEP 4 – Connect to another Shimmer (“2C02” in this example):



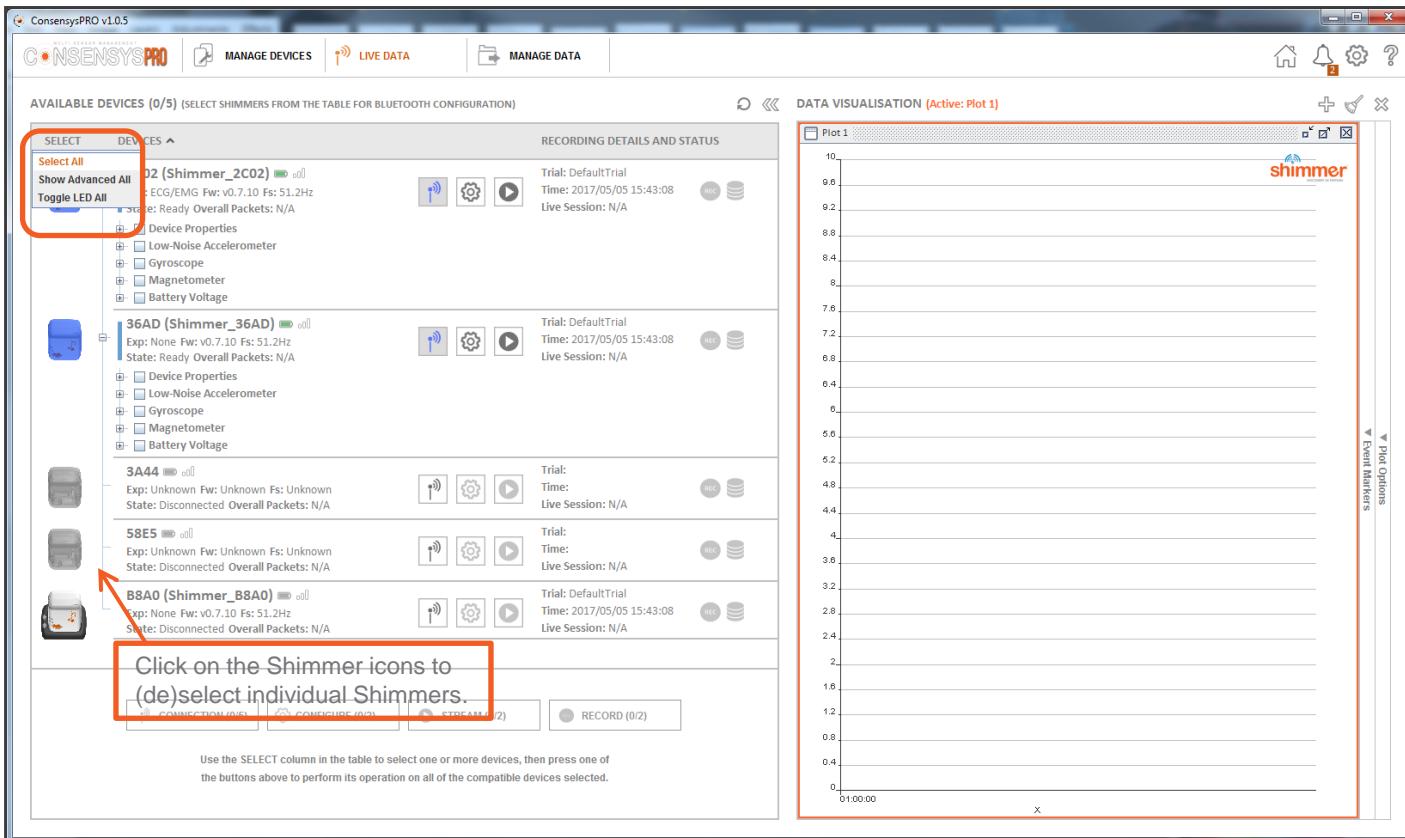
STREAMING – CONNECT (5/5)

STEP 5 – Find both connected Shimmers at the top of AVAILABLE SHIMMERS:



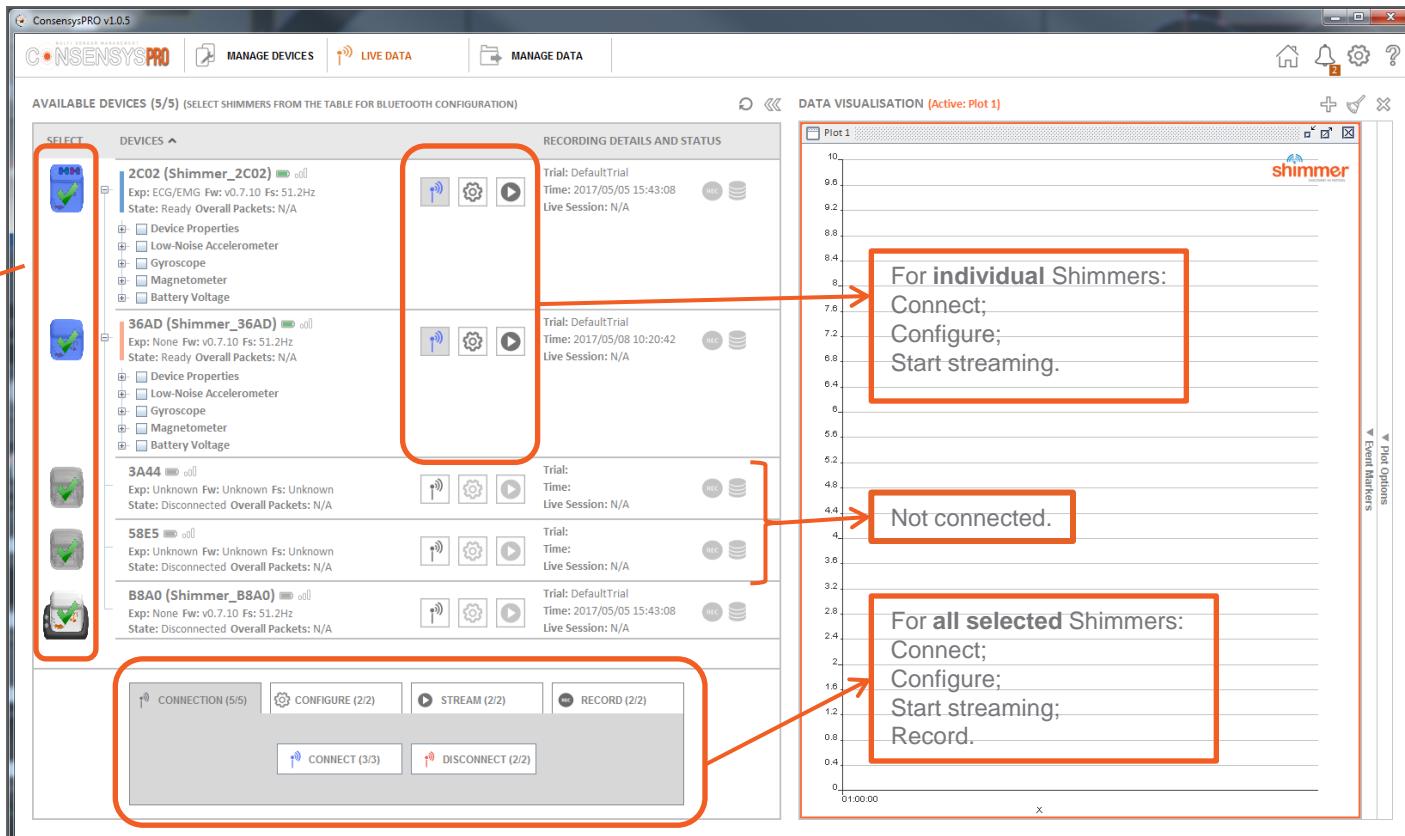
STREAMING – CONFIGURE TRIAL (1/7)

STEP 1 – Select Shimmers – e.g. by right-clicking on “SELECT”, press “Select All”:



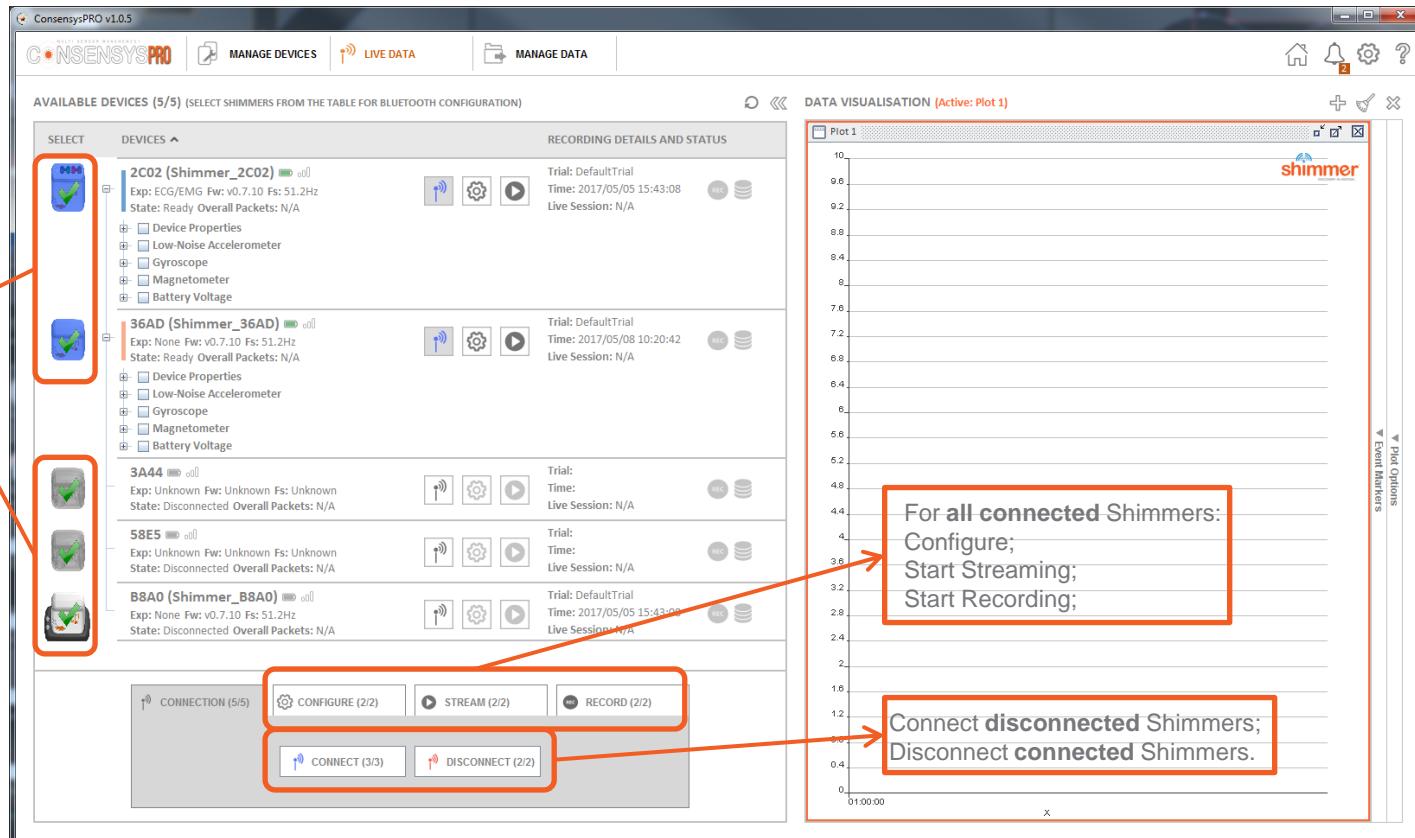
STREAMING – CONFIGURE TRIAL (2/7)

STEP 2 – Selecting Shimmers enables Group Buttons:



STREAMING – CONFIGURE TRIAL (3/7)

STEP 3 – Selecting Shimmers enables Group Buttons – continued:



STREAMING – CONFIGURE TRIAL (4/7)

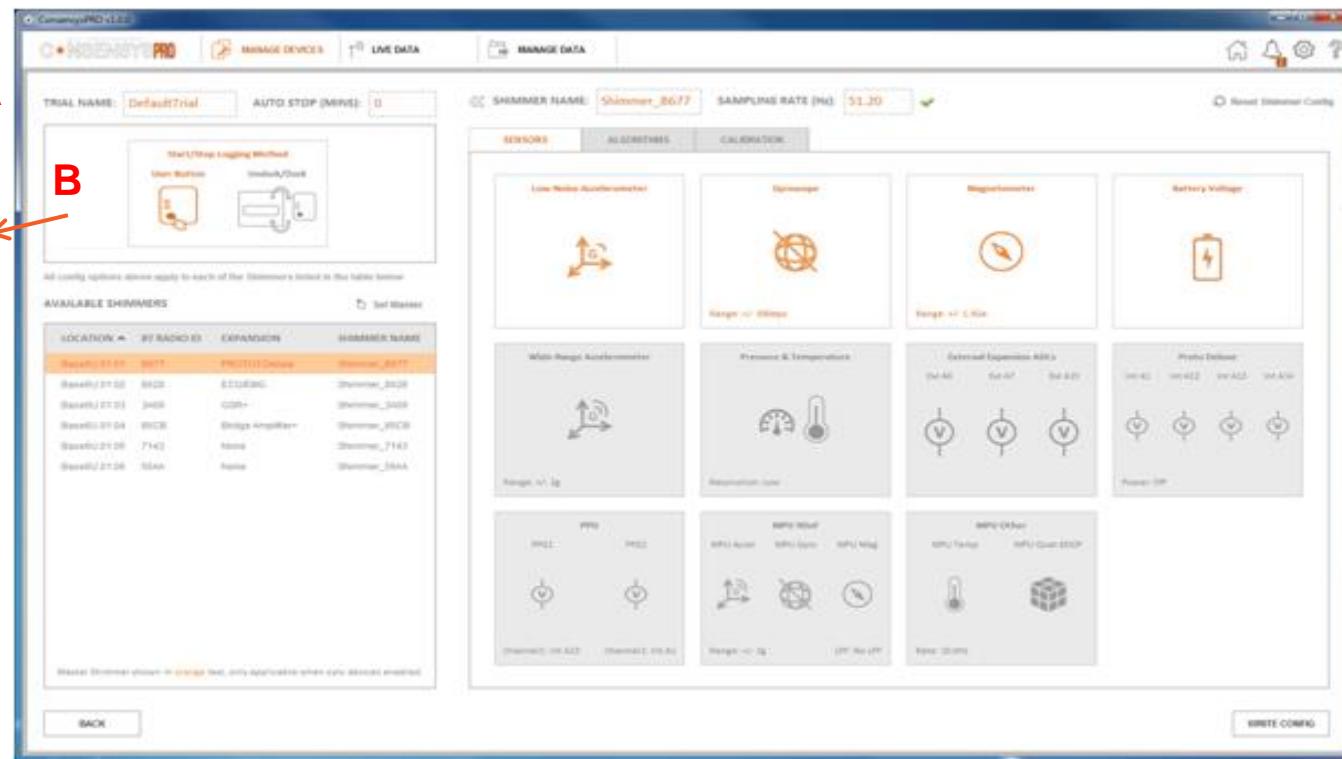
STEP 4 – Configure the connected Shimmers – click “Configure tab”:

The screenshot shows the ConsensysPRO v1.0.5 software interface. On the left, the 'AVAILABLE DEVICES (5/5)' section lists five Shimmer devices under the 'SELECT' tab. The first two devices, '2C02 (Shimmer_2C02)' and '36AD (Shimmer_36AD)', are highlighted with blue checkmarks and have a blue border around them. The third device, '3A44', has a grey checkmark and a grey border. The fourth and fifth devices, '58E5' and 'B8AO', also have grey checkmarks and grey borders. A red arrow points from the text 'N.B. Colour identification is different for Shimmers that NOT belong to the same Trial.' to the '3A44' device. Below the device list, there are four tabs: 'CONNECTION (5/5)', 'CONFIGURE (2/2)' (which is highlighted with a red box), 'STREAM (2/2)', and 'RECORD (2/2)'. At the bottom, there are 'CONNECT (3/3)' and 'DISCONNECT (2/2)' buttons. To the right, the 'DATA VISUALISATION' window is open, showing a plot titled 'Plot 1' with a y-axis ranging from 0 to 10 and an x-axis labeled '01:00:00'. A red box highlights the text 'N.B. Only Shimmers configured simultaneously belong to the same trial and have the same colour identification.'

STREAMING - CONFIGURE TRIAL (5/7)

STEP 5 – Set TRIAL NAME:

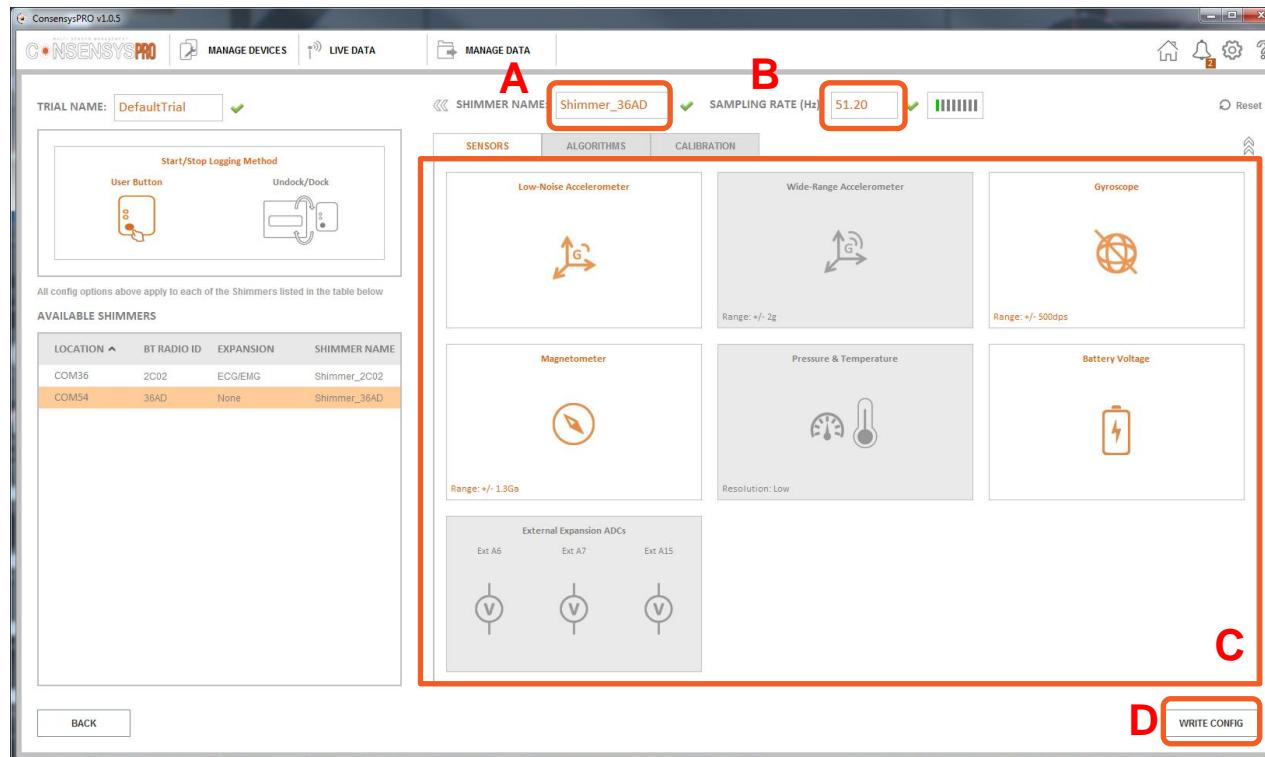
- Choose TRIAL NAME.
- Start/Stop Logging Method cannot be changed when connected over Bluetooth.



STREAMING - CONFIGURE TRIAL (6/7)

STEP 6 – Set parameters for each Shimmer:

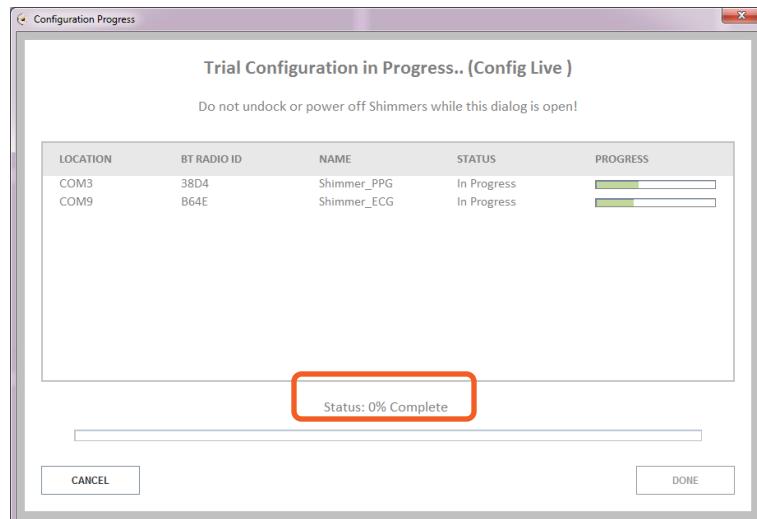
- A. Choose SHIMMER NAME.
- B. Choose SAMPLING RATE.
- C. Click on the tiles to enable and configure sensors.
- D. When all Shimmer are configured, click “WRITE CONFIG” to write the configuration to the Shimmers.



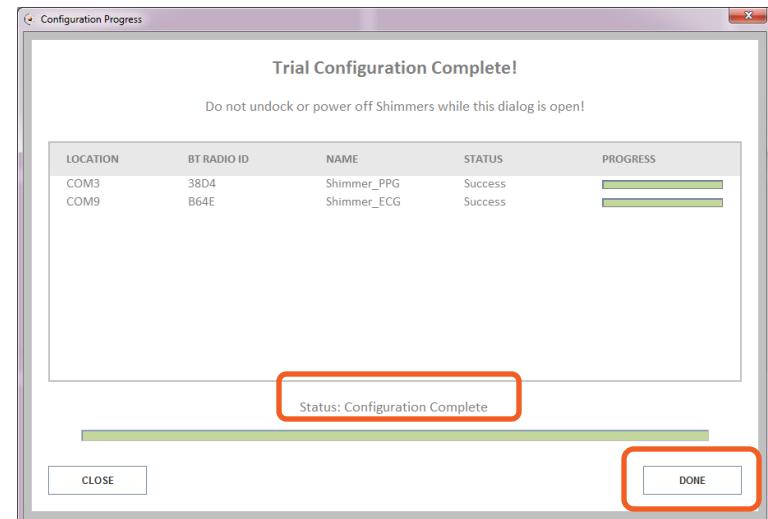
STREAMING - CONFIGURE TRIAL (7/7)

STEP 7 – WRITE CONFIG.

Wait until Trial Configuration is written:

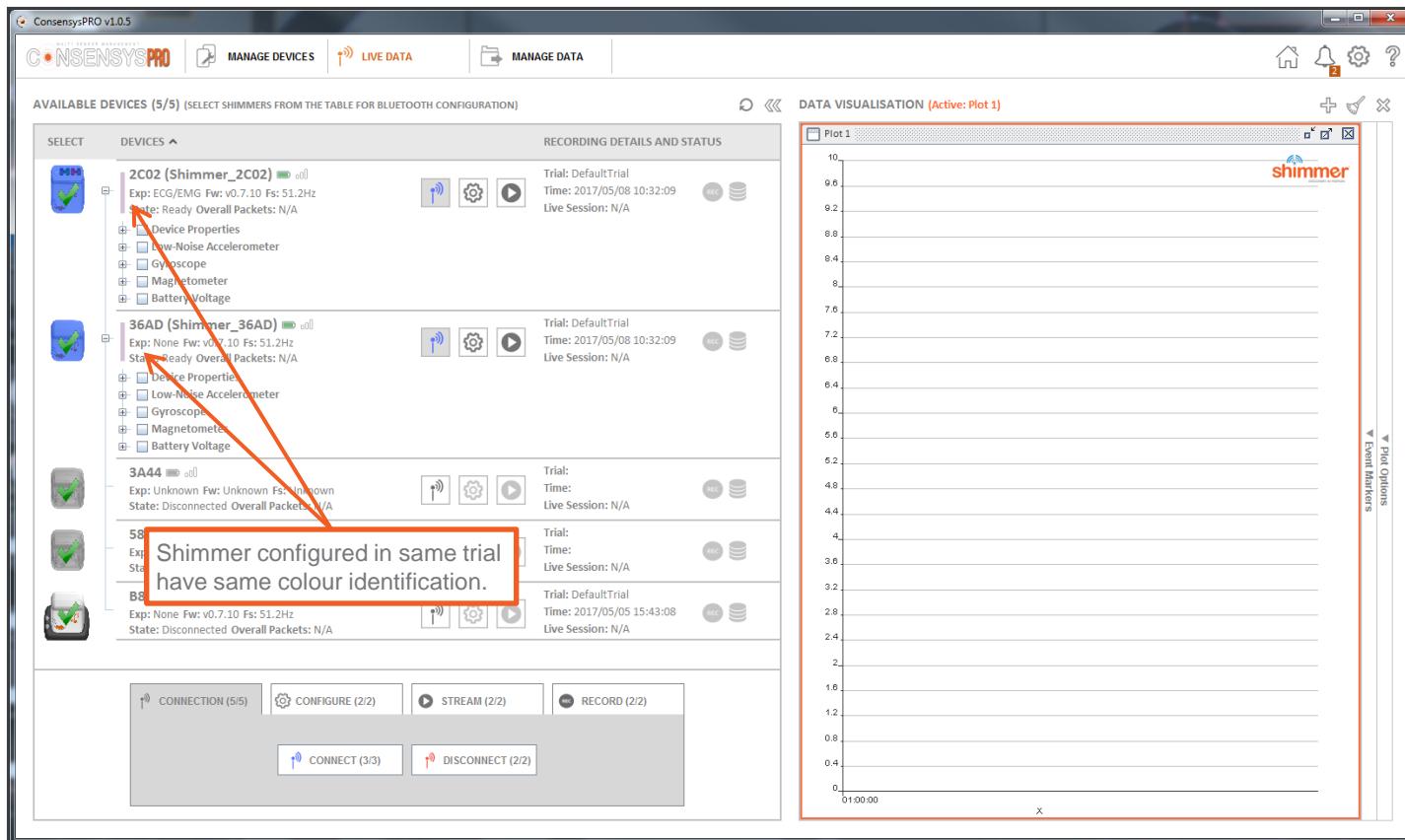


Click “NEXT” to complete the configuration:



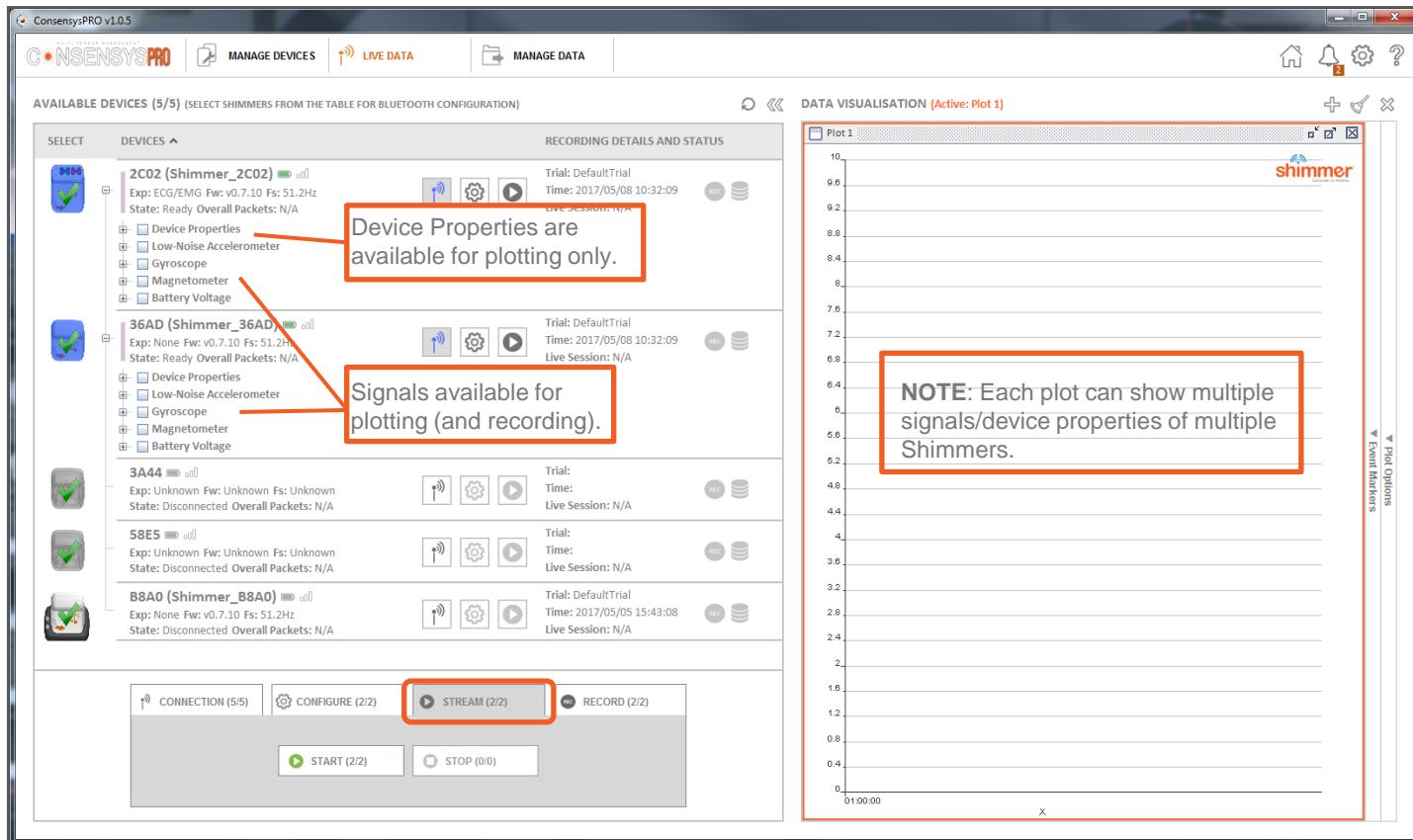
STREAMING - STREAM & PLOT (1/5)

STEP 1 – Undock Shimmers before streaming:



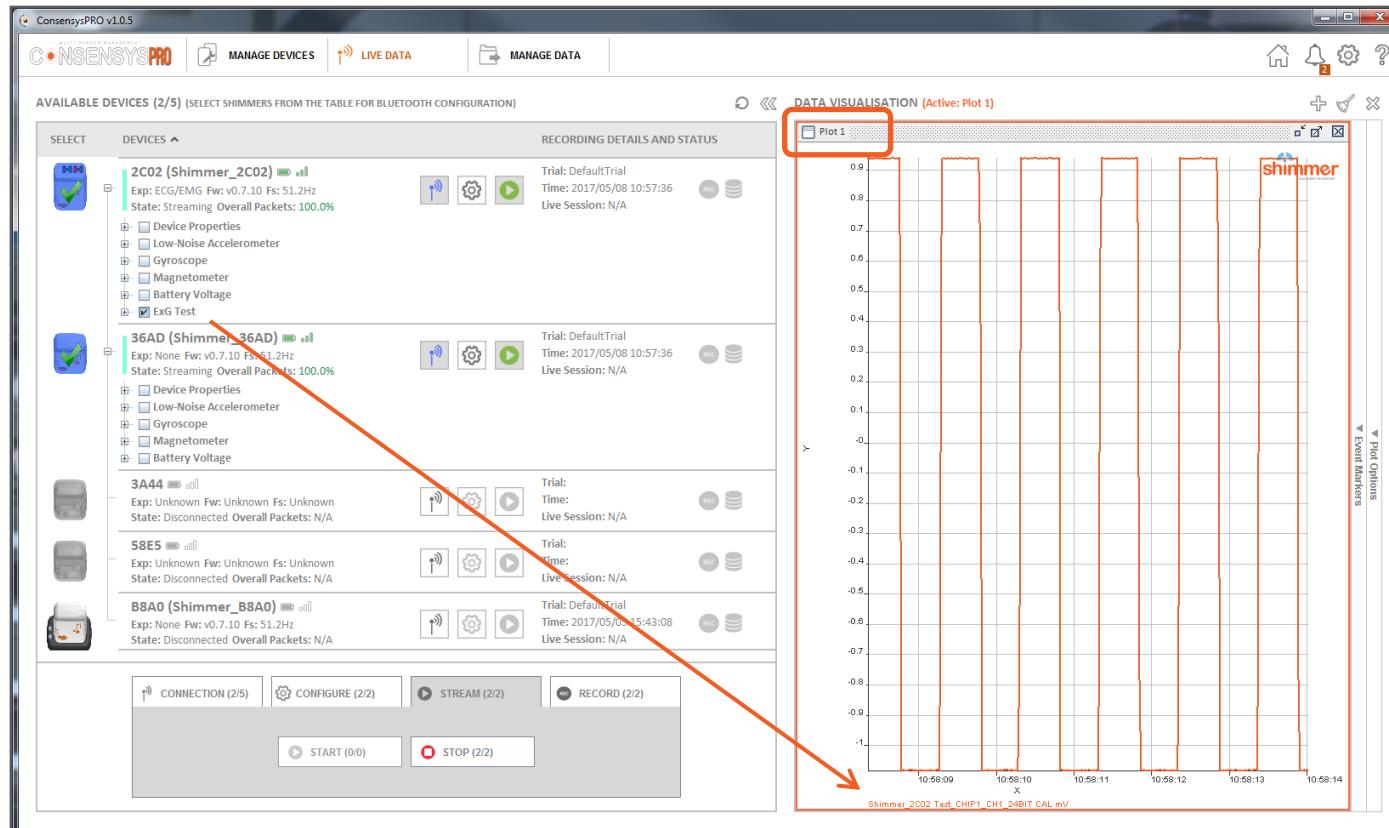
STREAMING - STREAM & PLOT (2/5)

STEP 2 – Select signals to plot and press “START” to start streaming:



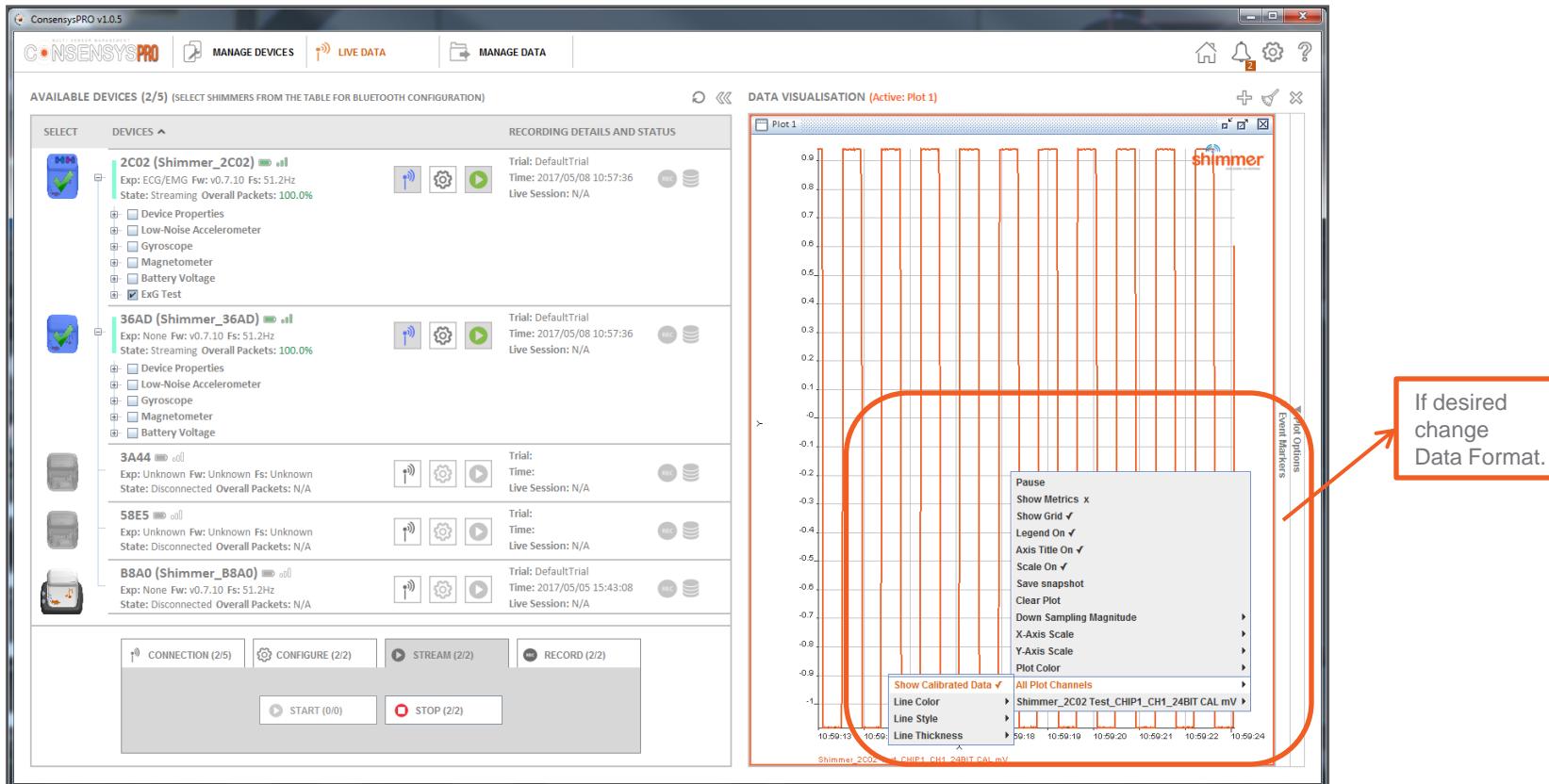
STREAMING - STREAM & PLOT (3/5)

Example: Signal “ExG Test” is plotted in “Plot 1”:

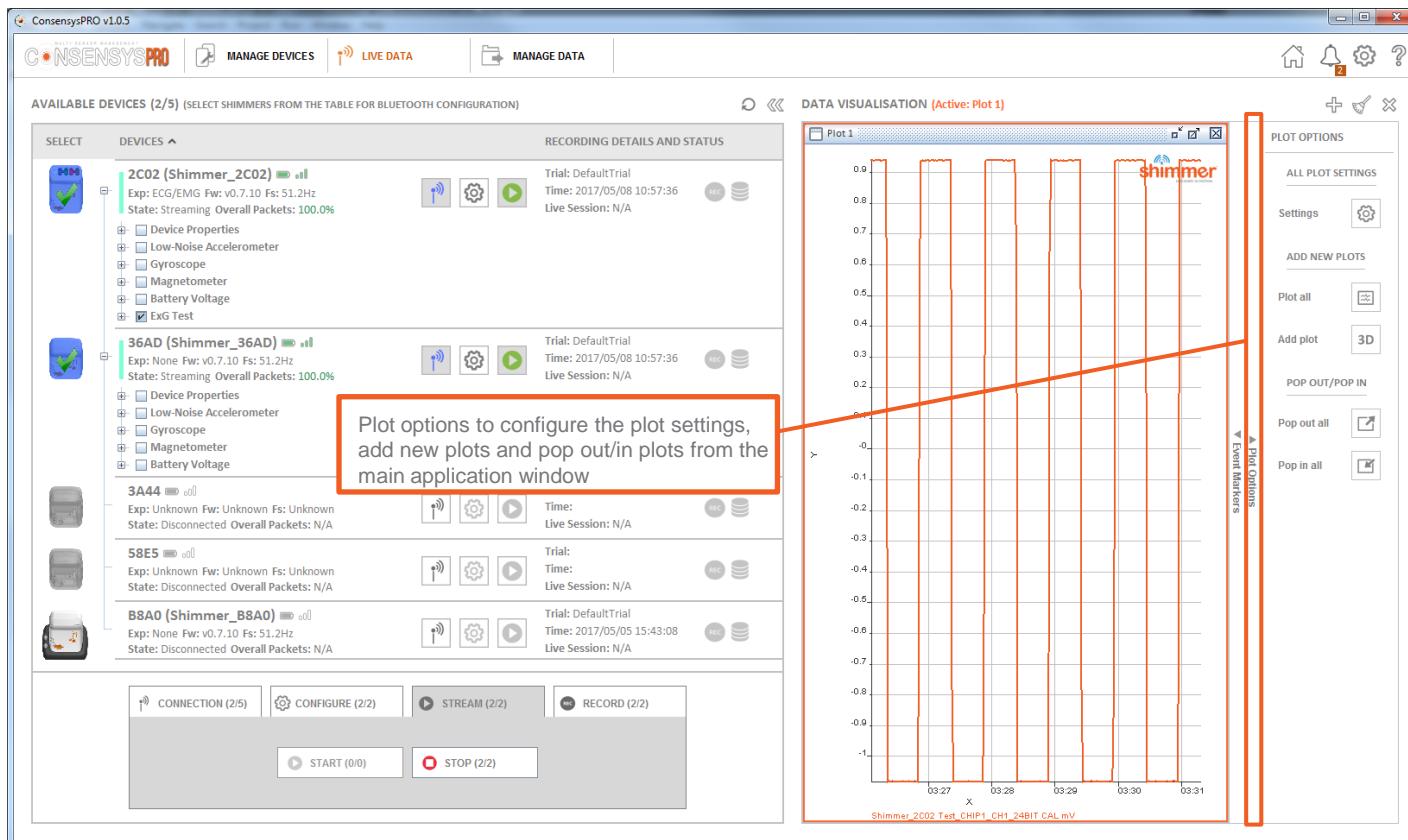


STREAMING - STREAM & PLOT (4/5)

STEP 4 – Right-click in a plot window to change its properties:

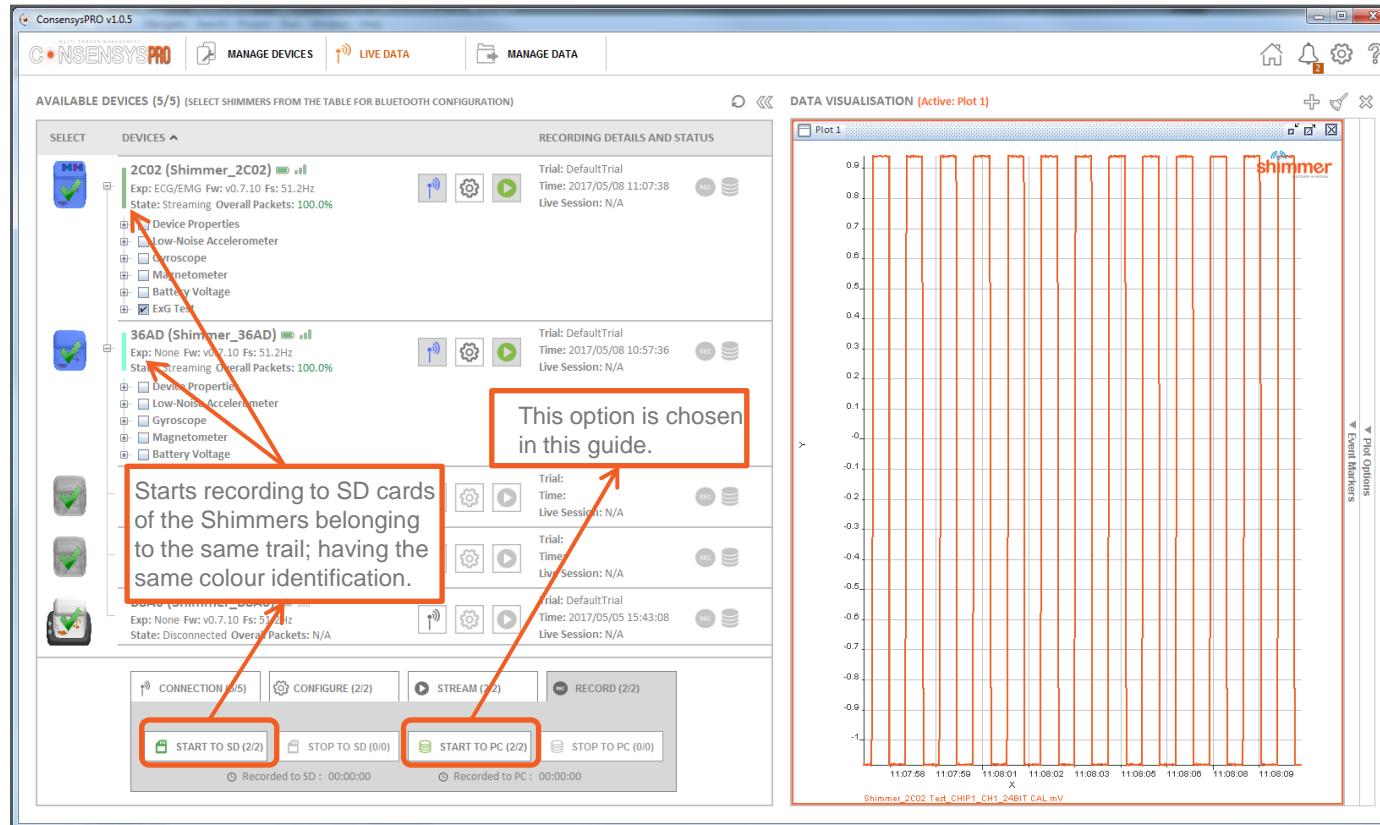


STREAMING - STREAM & PLOT (5/5)



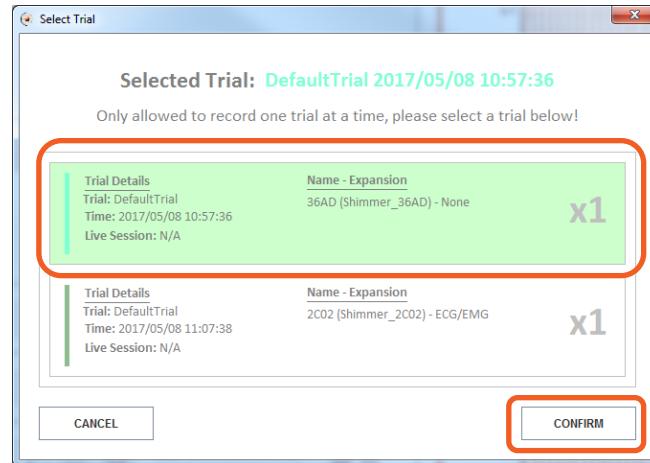
STREAMING - RECORD (1/4)

STEP 1 – Press buttons on “RECORD” tab to start recording – Choose “START TO PC”:



STREAMING - RECORD (2/4)

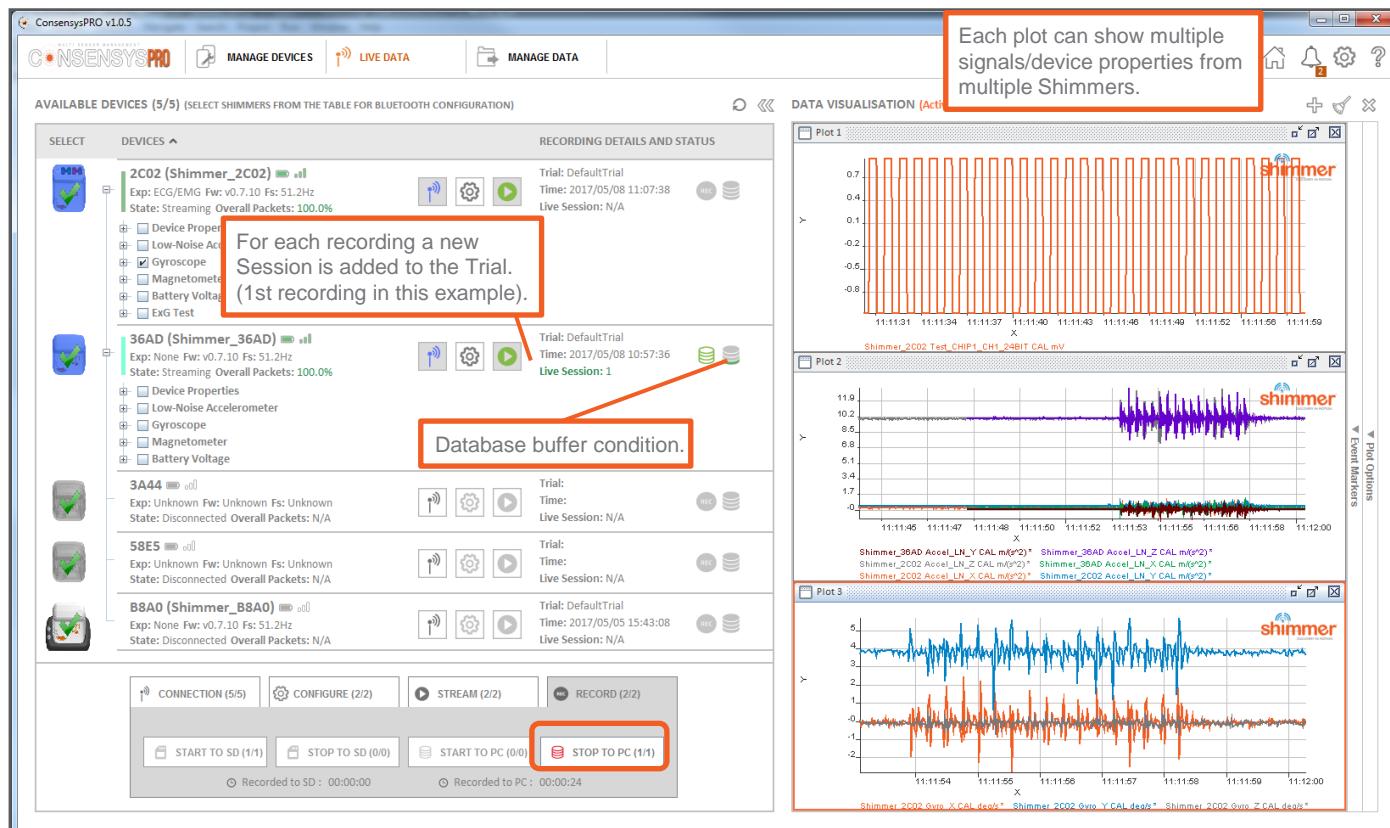
STEP 2 – Select the trial for recording and press “CONFIRM”:



N.B. This dialog only shows up when Shimmers across multiple trials have been selected.

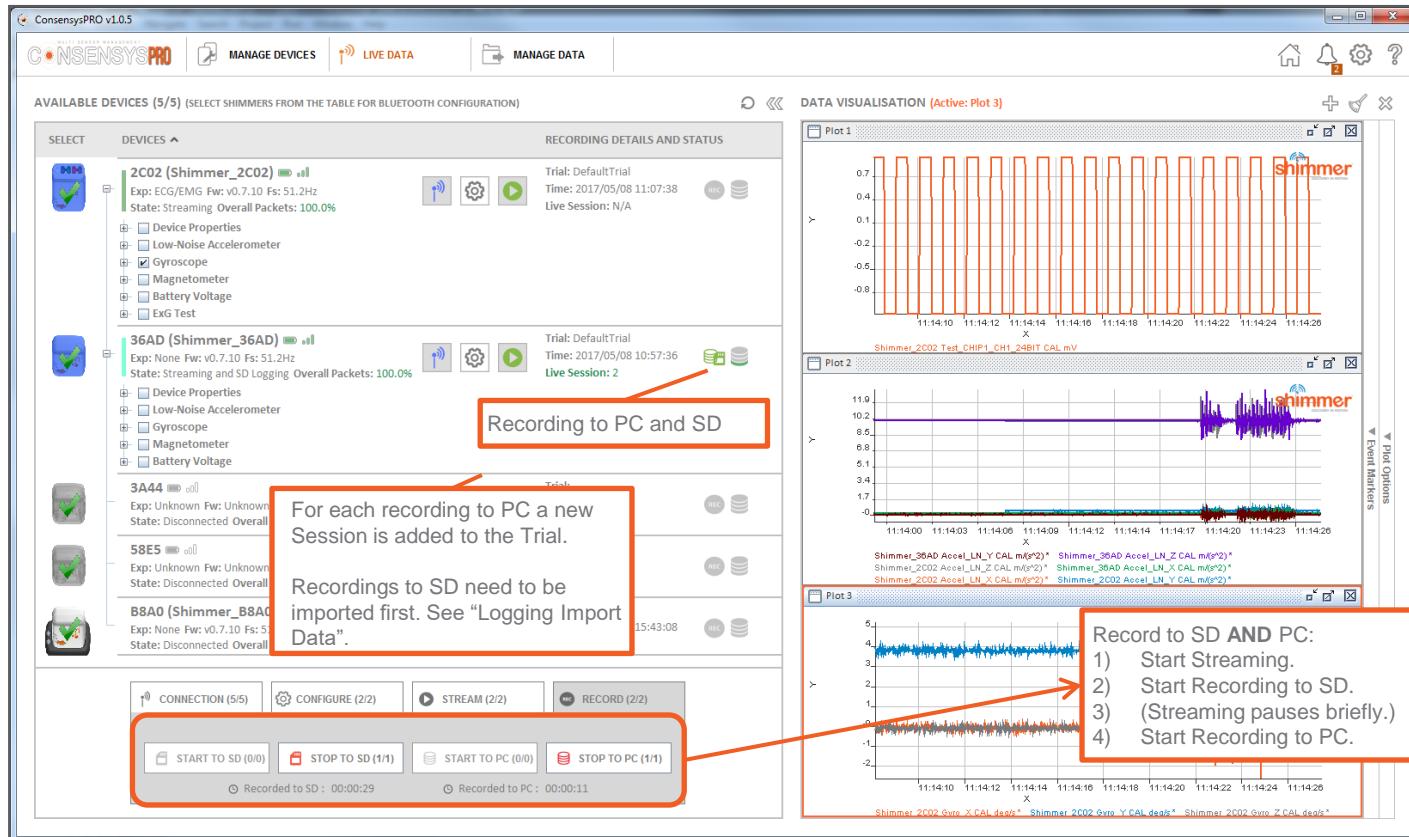
STREAMING - RECORD (3/4)

STEP 3 – Press “STOP TO PC” to stop recording to PC:



STREAMING - RECORD (4/4)

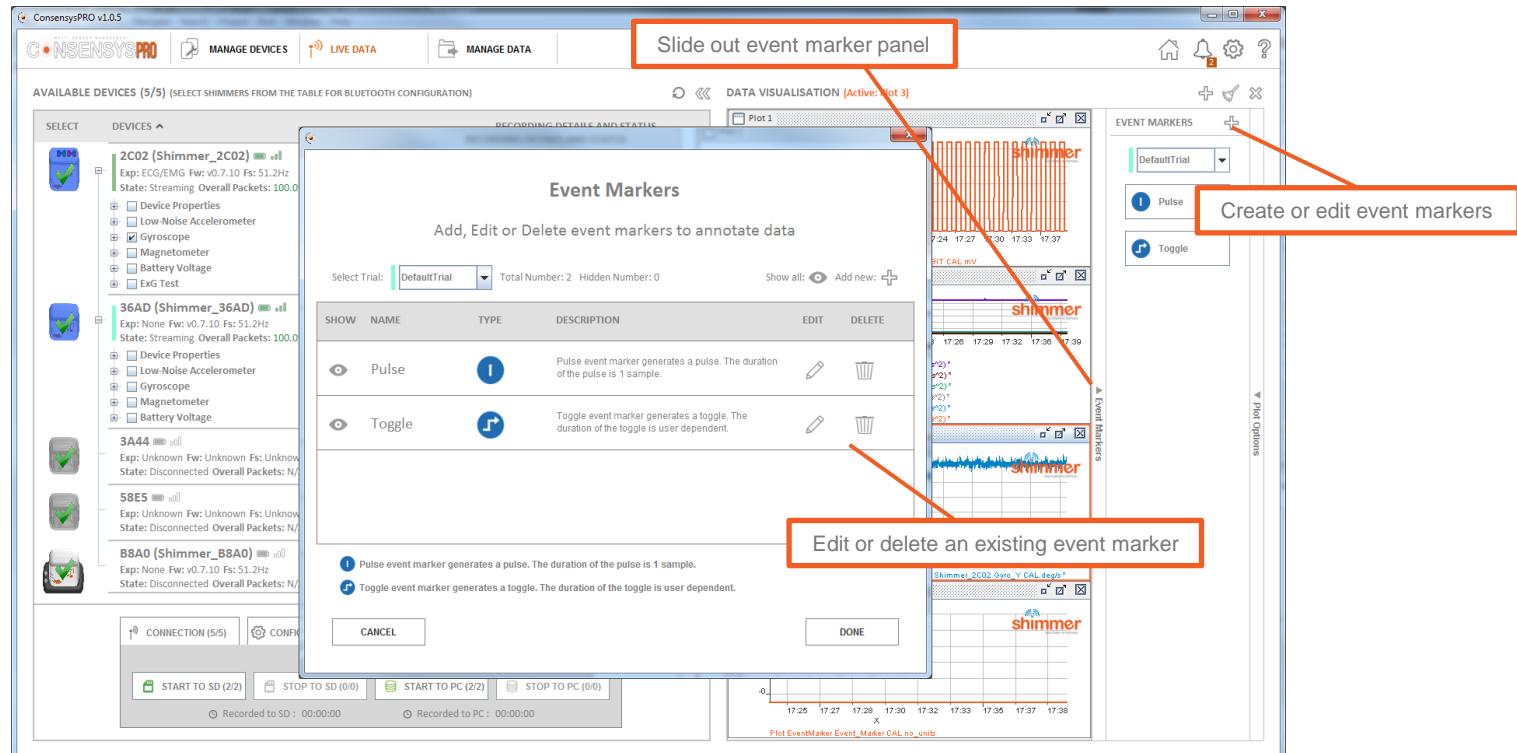
STEP 4 – To record simultaneously to SD and PC:



STREAMING – EVENT MARKERS (1/3)

Event markers can be used to annotate incidents that occur during data collection

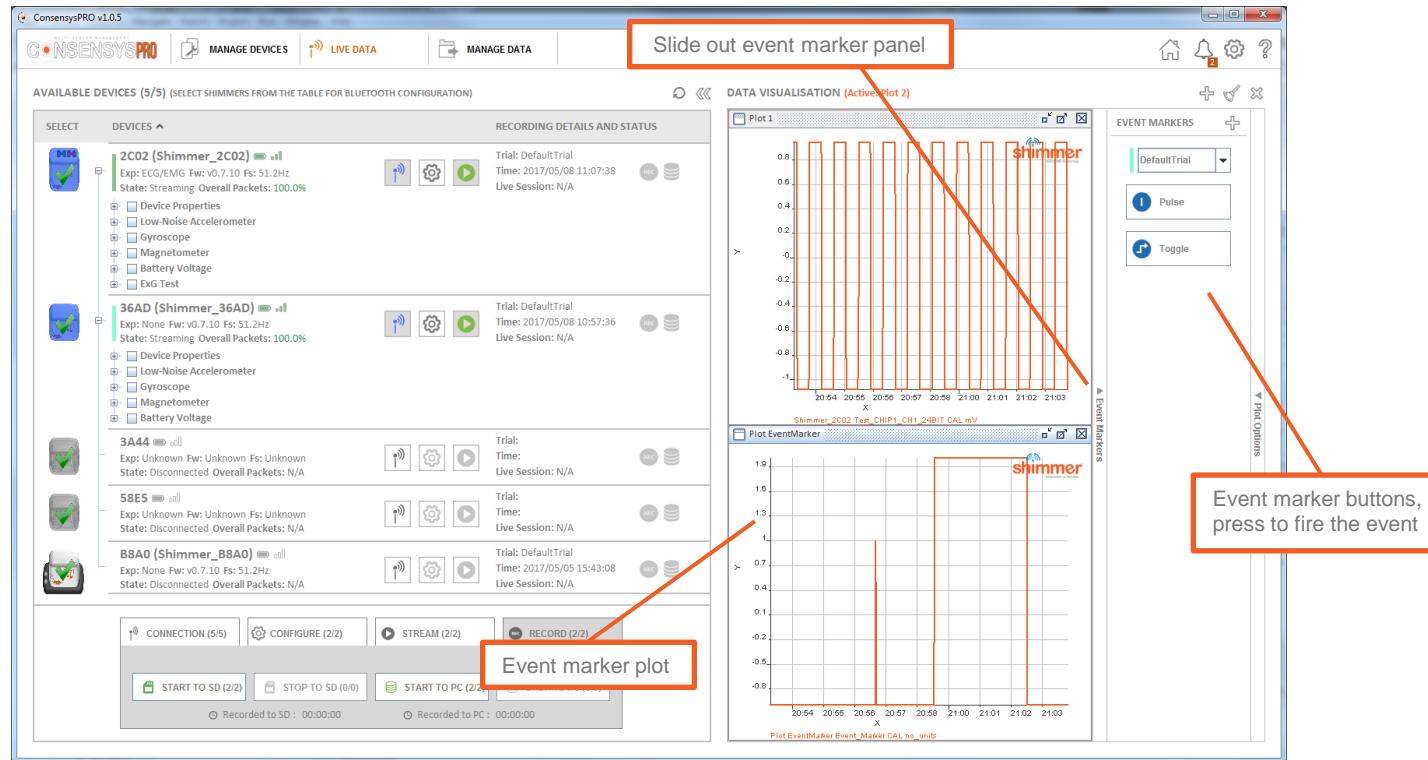
STEP 1 – Create or edit event markers (of type Pulse and/or Toggle) when at least one Shimmer is connected over Bluetooth:



N.B. ConsensysBASIC does not support event markers!

STREAMING – EVENT MARKERS (2/3)

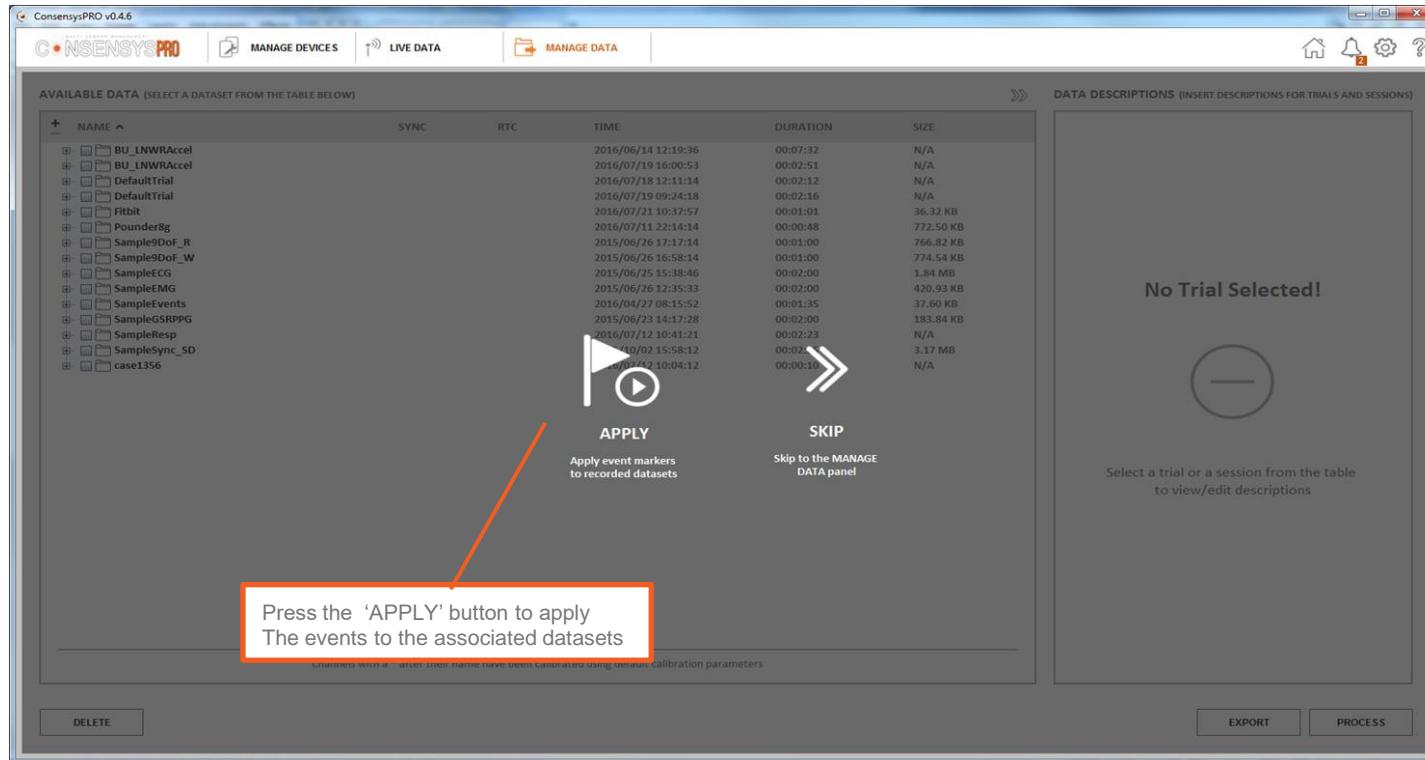
STEP 2 – Show the available event markers (buttons) when at least one Shimmer is connected data over Bluetooth and fire the event by pressing the relevant event button.



N.B. The event marker value is a code relating to the number of the event

STREAMING – EVENT MARKERS (3/3)

STEP 3 – Apply the used event markers to the associated datasets. Then the event marker data will get exported along with the Shimmer sensor data.



MANAGE DATA

“MANAGE DATA” – Interfaces with Consensys’ database.

Consensys’ database holds:

- **SD-Recordings**: imported data from Shimmer SD cards – see [Logging – Import Data](#).
- **PC-Recordings**: recorded data streamed to the PC – see [Streaming – Record](#).

In this section:

- [General](#)
- [Export](#)
- [Delete](#)
- [Process](#)

MANAGE DATA – GENERAL

AVAILABLE DATA (SELECT A SINGLE TRIAL AND MULTIPLE SESSIONS AND/OR DEVICES FOR EXPORT OR PROCESSING)

NAME	SYNC	RTC	TIME	DURATION	SIZE
Config Live			2015/11/12 14:20:48	00:07:51	422.35 KB
SD Recording			2015/11/12 14:48:35	00:00:43	422.35 KB
Session 2			2015/11/12 14:48:45	00:00:35	N/A
Session 1			2015/11/12 14:48:49	00:00:35	N/A
Shimmer_SCG - 512.0Hz - 100%			2015/11/12 14:49:43	00:00:11	N/A
Shimmer_PPG - 256.0Hz - 100%			2015/11/12 14:49:43	00:00:11	N/A
Shimmer_ECG - 512.0Hz - 99%			2015/11/12 14:49:43	00:00:11	N/A
Session 2			2015/11/12 14:49:43	00:00:11	N/A
Shimmer_PPG - 256.0Hz - 99%			2015/11/12 14:49:43	00:00:11	N/A
Shimmer_ECG - 512.0Hz - 99%			2015/11/12 14:49:43	00:00:11	N/A
Session 4			2015/11/12 14:49:43	00:00:11	N/A
Shimmer_PPG - 256.0Hz - 100%			2015/11/12 14:49:43	00:00:11	N/A
Shimmer_ECG - 512.0Hz - 99%			2015/11/12 14:49:43	00:00:11	N/A
GS-v0.4.0			2015/11/12 14:49:43	00:00:11	N/A
PPG			2015/11/12 14:49:43	00:00:11	N/A
Sample9DoF_R			2015/11/12 14:49:43	00:00:11	N/A
Sample9DoF_W			2015/11/12 14:49:43	00:00:11	N/A
SampleECG			2015/11/12 14:49:43	00:00:11	N/A
SampleEMG			2015/11/12 14:49:43	00:00:11	N/A
SampleGSRPG			2015/11/12 14:49:43	00:00:11	N/A
SampleSync_SD			2015/11/12 14:49:43	00:00:11	N/A
SD Recording			2015/10/02 16:08:05	00:02:25	3.17 MB
Session 1			2015/10/02 16:08:05	00:02:00	1.06 MB
Shimmer_36AD - 1024.0Hz - 98%			2015/10/02 16:08:14	00:02:00	1.06 MB
Shimmer_3804 - 1024.0Hz - 98%			2015/10/02 16:08:14	00:01:59	1.05 MB
Shimmer_3804 - 1024.0Hz - 98%			2015/10/02 16:08:14	00:01:59	1.05 MB

Imported logged data from one Session of a Trial with three Shimmers with SDLog firmware, with synchronisation enabled. (Synchronisation for logging trials is only available for SDLog firmware).

- "M" indicates the Master Shimmer.
- The post-process synchronisation has been successful, indicated by the green ticks in the SYNC column.

(Details on the synchronisation process for logging trials can be found in the SDLog firmware user manual.)

Channels with a * after their name have been calibrated using default calibration parameters

DATA DESCRIPTIONS (INSERT DESCRIPTIONS FOR TRIALS AND SESSIONS)

- Config Live - 2015/11/12 14:20:48**: Trial information can be added here. Trial "Config Live" is configured during the creation of this instruction document and a few recordings are have been made as specified in the session info below.
- SD Recording - Session 2**: SD Recording - Session 1 has been deleted. For Session 2 the RTC (Real Time Clock) has been set for both Shimmers.
- PC Recording - Session 1**: For this session the data of both Shimmers have not been synchronised yet. The User can synchronise the data of both Shimmers by clicking on the icon with the circular arrows in the SYNC column, the data icons will be the same as for session 4
- PC Recording - Session 2**: For this session the data cannot be synchronised, because the recording lasted only 11 seconds.
- PC Recording - Session 4**

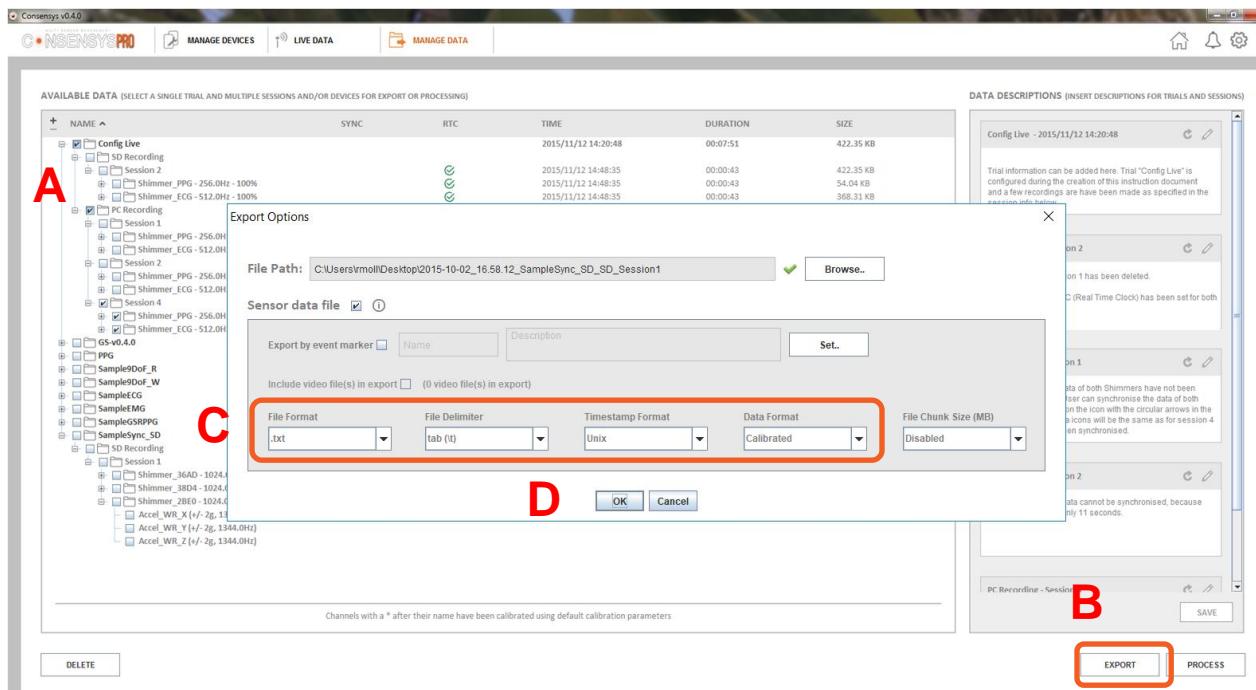
EXPORT **PROCESS**

N.B. ConsensysBASIC does not support DATA DESCRIPTIONS!

MANAGE DATA – EXPORT (1/2)

STEP 1 – EXPORT – Select data and format:

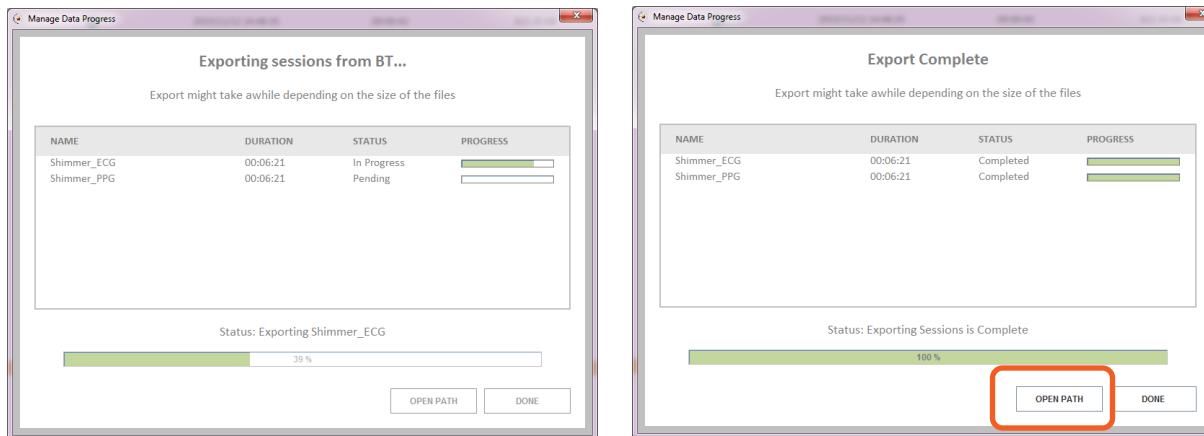
- Select one or more sessions from one trial.
- Hit “Export” to export the selected data to a file in the requested format.
- Select “File Delimiter”, “File Format”, “Timestamp Format”, “Data Format”.
- Press “Ok”



MANAGE DATA – EXPORT (2/2)

STEP 2 – EXPORT – Export the data:

- A. When Export is complete, click “OPEN PATH” to navigate to the exported file(s).
- B. Open the file with a spreadsheet application, or with for example MATLAB.



MANAGE DATA – DELETE (1/3)

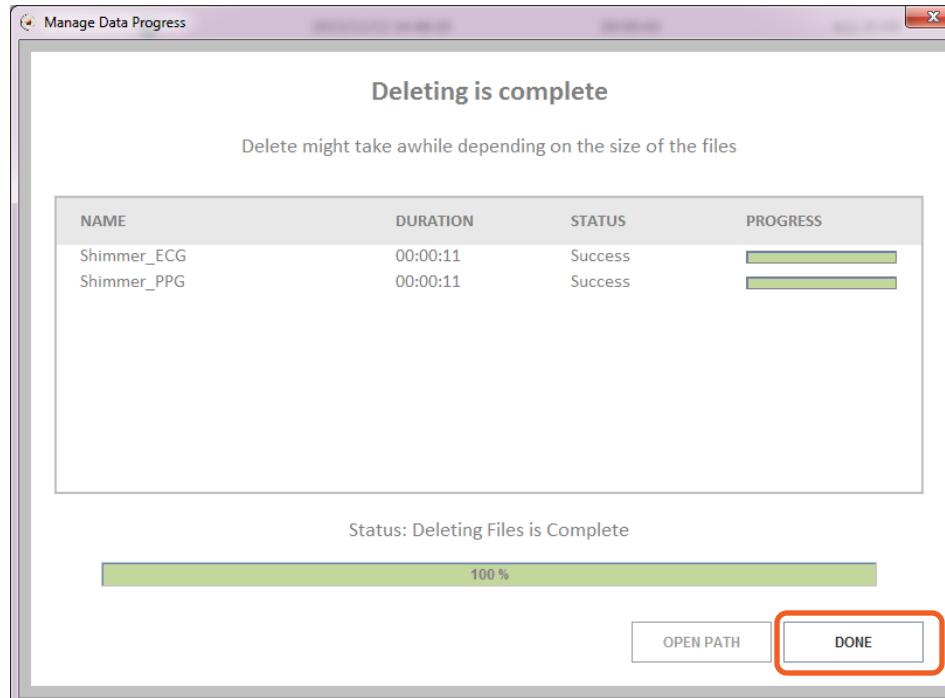
STEP 1 – DELETE – Select and delete data:

- Select data to be deleted – this can.
- Hit “DELETE” to delete the selected data from the database (and hit “YES” to confirm).

The screenshot shows the Consensys v0.40 software interface. The main window has tabs for "MANAGE DEVICES", "LIVE DATA", and "MANAGE DATA". The "MANAGE DATA" tab is active. On the left, there's a tree view of "AVAILABLE DATA" with categories like "Config Live", "SD Recording", "PC Recording", "GS-v0.4.0", "PPG", etc. In the "PC Recording" section, several sessions are listed under "Session 1" and "Session 2". On the right, there are four panels titled "DATA DESCRIPTIONS" for "Config Live", "SD Recording - Session 2", "PC Recording - Session 1", and "PC Recording - Session 2". A "Permanently delete selected data?" dialog box is centered over the main data area, asking if the user wants to proceed. At the bottom, there are buttons for "DELETE", "EXPORT", and "PROCESS".

MANAGE DATA – DELETE (2/3)

STEP 2 – DELETE – Click “DONE” when Deleting Files is Complete:



MANAGE DATA – DELETE (3/3)

STEP 3 – DELETE – Confirm data has been deleted:

Before deleting:

AVAILABLE DATA (SELECT A SINGLE TRIAL AND MULTIPLE SESSIONS AND/OR DEVICES FOR EXPORT OR PROCESSING)

NAME	SYNC	RTC	TIME	DURATION	SIZE
Config Live			2015/11/12 14:20:48	00:07:51	422.35 KB
SD Recording			2015/11/12 14:48:35	00:00:43	422.35 KB
Session 2			2015/11/12 14:48:35	00:00:43	54.04 KB
Shimmer_PPG - 256.0Hz - 100%			2015/11/12 14:48:35	00:00:43	368.31 KB
Shimmer_ECG - 512.0Hz - 100%			2015/11/12 14:48:49	00:00:35	N/A
Session 1			2015/11/12 14:48:49	00:00:35	N/A
Shimmer_PPG - 256.0Hz - 100%			2015/11/12 14:48:49	00:00:35	N/A
Shimmer_ECG - 512.0Hz - 100%			2015/11/12 14:48:49	00:00:11	N/A
Session 2			2015/11/12 14:49:43	00:00:11	N/A
Shimmer_PPG - 256.0Hz - 99%			2015/11/12 14:49:43	00:00:11	N/A
Shimmer_ECG - 512.0Hz - 99%			2015/11/12 14:49:43	00:00:11	N/A
Session 4			2015/11/12 14:55:10	00:06:21	N/A
Shimmer_PPG - 256.0Hz - 100%			2015/11/12 14:55:10	00:06:21	N/A
Shimmer_ECG - 512.0Hz - 100%			2015/11/12 14:55:10	00:06:21	N/A
GS-v0.4.0					
PPG					
SampleDof_R					
SampleDof_W					
SampleCG					
SampleMG					
SampleSRPPG					
SampleSync_SD					
SD Recording					
Session 1					
Shimmer_36AD - 1024.0Hz - 98%			2015/10/02 16:08:05	00:02:25	3.17 MB
Shimmer_38D4 - 1024.0Hz - 98%			2015/10/02 16:08:05	00:02:00	1.06 MB
Shimmer_2BE0 - 1024.0Hz - 98%			2015/10/02 16:08:14	00:02:00	1.06 MB
Shimmer_WR_X (+/- 2g, 1344.0Hz)			2015/10/02 16:08:31	00:01:59	1.05 MB
Accel_WR_X (+/- 2g, 1344.0Hz)					
Accel_WR_Y (+/- 2g, 1344.0Hz)					
Accel_WR_Z (+/- 2g, 1344.0Hz)					

Channels with a * after their name have been calibrated using default calibration parameters

DATA DESCRIPTIONS (INSERT DESCRIPTIONS FOR TRIALS AND SESSIONS)

Config Live - 2015/11/12 14:20:48

SD Recording - Session 2

PC Recording - Session 1

PC Recording - Session 2

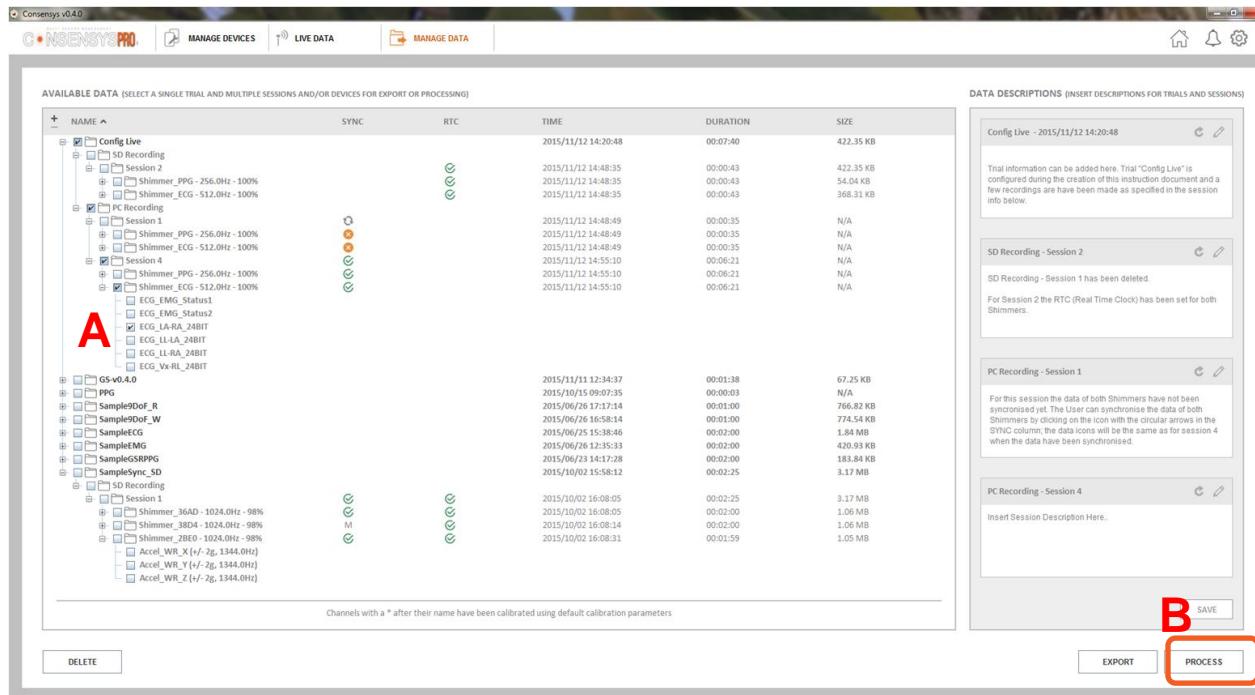
PC Recording - Session 4

EXPORT PROCESS

MANAGE DATA – PROCESS (1/5)

STEP 1 – Select data:

- Select data to process – e.g. “ECG_LA_RA_24BIT” from Shimmer called: “Shimmer_ECG”.
- Click “PROCESS”.

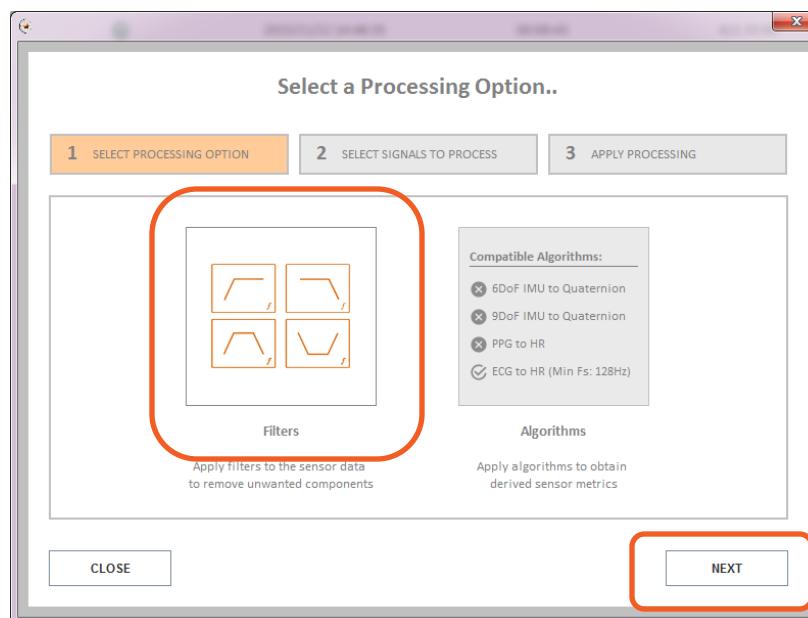


N.B. ConsensysBASIC does not support off-line data processing

MANAGE DATA – PROCESS (2/5)

STEP 2 – Select a Processing Option:

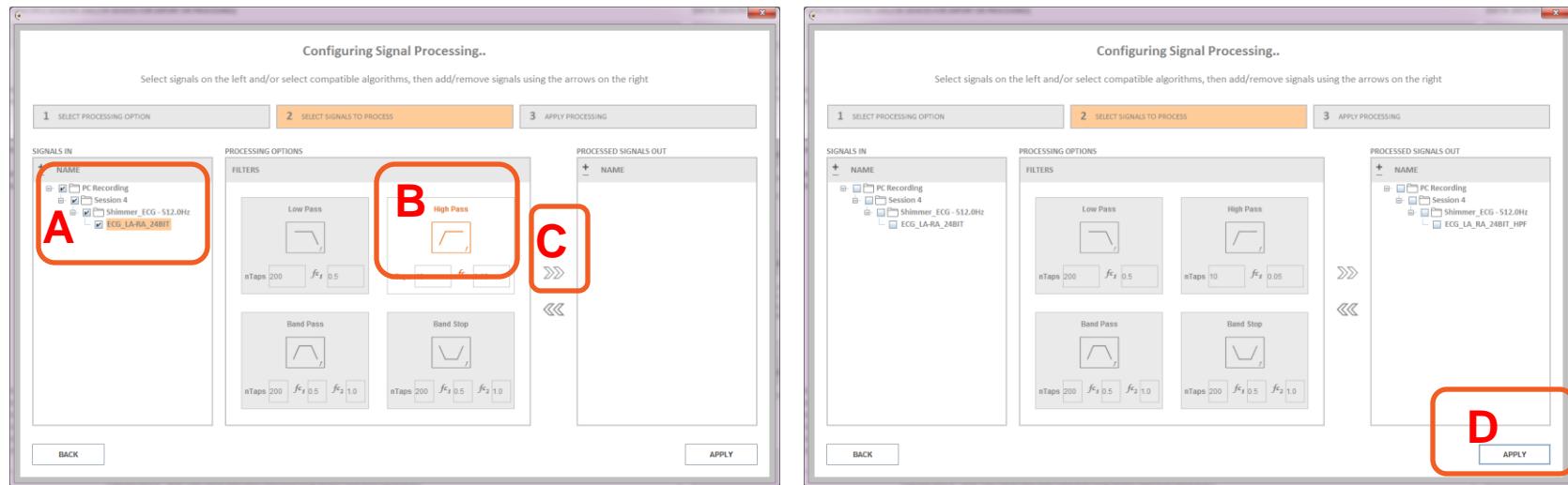
- A. Select **Filters** or **Algorithms** – only algorithms compatible with the selected data can be selected.
- B. Note that **Filters** only applies one filter operation to the selected signal(s). Follow STEPS 1 to 3 on the processed signal(s) to apply a successive filter operation.
- C. Click “NEXT”.



MANAGE DATA – PROCESS (3/5)

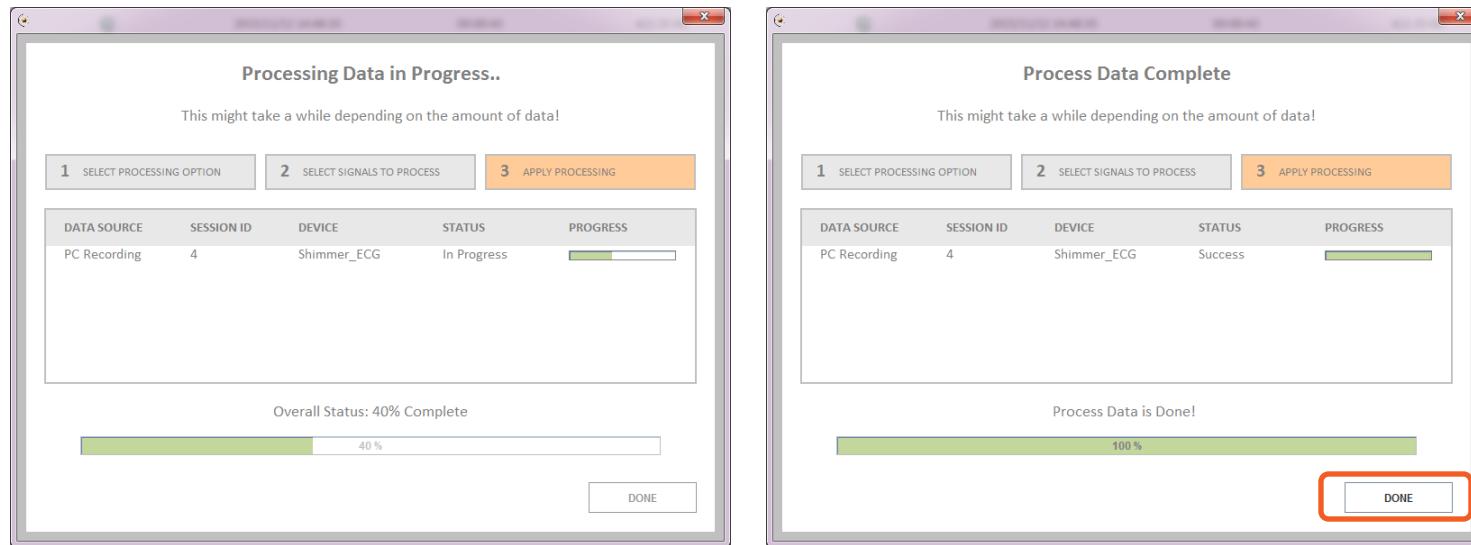
STEP 3 – Configuring Signal Processing:

- A. Select signals to process. (In this example only one signal was selected, so there is nothing else to select.)
- B. Select filter parameters.
- C. Add to the “PROCESSED SIGNALS OUT” list for the next stage.
- D. Hit “Apply”.



MANAGE DATA – PROCESS (4/5)

STEP 4 – Processing Data in Progress – Click “DONE” when complete:



MANAGE DATA – PROCESS (5/5)

STEP 5 – Confirm processing has been applied:

“ECG_LA_RA_24BIT_HPF” has been added to the session.

AVAILABLE DATA (SELECT A SINGLE TRIAL AND MULTIPLE SESSIONS AND/OR DEVICES FOR EXPORT OR PROCESSING)

NAME	SYNC	RTC	TIME	DURATION	SIZE
Config Live			2015/11/12 14:20:48	00:07:40	422.35 KB
SD Recording					
Session 2			2015/11/12 14:48:35	00:00:43	422.35 KB
Shimmer_PPG - 256.0Hz - 100%			2015/11/12 14:48:35	00:00:43	54.04 KB
Shimmer_ECG - 512.0Hz - 100%			2015/11/12 14:48:35	00:00:43	368.31 KB
Session 1			2015/11/12 14:48:49	00:00:35	N/A
Shimmer_PPG - 256.0Hz - 100%			2015/11/12 14:48:49	00:00:35	N/A
Shimmer_ECG - 512.0Hz - 100%			2015/11/12 14:48:49	00:00:35	N/A
Session 4			2015/11/12 14:55:10	00:06:21	N/A
Shimmer_PPG - 256.0Hz - 100%			2015/11/12 14:55:10	00:06:21	N/A
Shimmer_ECG - 512.0Hz - 100%			2015/11/12 14:55:10	00:06:21	N/A
ECG_EMG_Status1					
ECG_EMG_Status2					
CO2_Device_2401					
ECG_LA_RA_24BIT_HPF	<input checked="" type="checkbox"/>				
ECG_U1_RA_24BIT					
ECG_Vx_RU_24BIT					
GS-v0.4.0					
PPG					
SampleDof_R					
SampleDof_W					
SampleECG					
SampleEMG					
SampleERP					
SampleSync_SD					
SD Recording					
Session 1			2015/10/09 12:34:37	00:01:38	67.25 KB
Shimmer_36AD - 1024.0Hz - 98%			2015/10/15 09:07:35	00:00:03	N/A
Shimmer_3804 - 1024.0Hz - 98%			2015/06/26 17:17:14	00:01:00	766.82 KB
Shimmer_2801 - 1024.0Hz - 98%			2015/06/26 16:58:14	00:01:00	774.54 KB
Shimmer_2801 - 1024.0Hz - 98%			2015/06/25 15:52:04	00:02:00	1.84 MB
Accel_WR_X (+/- 2g, 1344.0Hz)			2015/06/26 12:25:33	00:02:00	420.93 KB
Accel_WR_Y (+/- 2g, 1344.0Hz)			2015/06/23 14:17:28	00:02:00	183.84 KB
Accel_WR_Z (+/- 2g, 1344.0Hz)			2015/10/02 15:58:12	00:02:25	3.17 MB

Channels with a * after their name have been calibrated using default calibration parameters

DELETE

EXPORT

PROCESS

DATA DESCRIPTIONS (INSERT DESCRIPTIONS FOR TRIALS AND SESSIONS)

Config Live - 2015/11/12 14:20:48

Trial information can be added here. Trial “Config Live” is configured during the creation of this instruction document and a few recordings are have been made as specified in the session info below.

SD Recording - Session 2

SD Recording - Session 1 has been deleted.

For Session 2 the RTC has been set for both Shimmers.

PC Recording - Session 1

For this session the data of both Shimmers has not been synchronised yet. The User can synchronise the data of both Shimmers by clicking on the icon with the circular arrows in the SYNC column, the data icons will be the same as for session 4 afterwards.

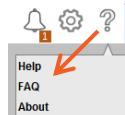
PC Recording - Session 4

Insert Session Description Here.

SAVE

THINGS YOU MIGHT NEED TO KNOW (1/5)

- The **green** and **blue** LED (in LED location B)
 1. Start *Consensys* and connect *Shimmer Dock* or *Base*.
 2. Place the Shimmer in the *Shimmer Dock* or *Base*.
 3. The Real Time Clock (RTC) of the Shimmer will be set.
 4. The blinking stops after the RTC has been set.

are **blinking rapidly**.
- **RTC:** If the “Real Time Clock” on the Shimmer is set, a relationship between “real-world time” and the local clock on the Shimmer is established, enabling synchronisation to a “common clock” among multiple Shimmer and external devices. **N.B.** Switching off Shimmers results in the loss of the RTC information. To set the RTC on the Shimmer, insert the Shimmer into a Shimmer Dock or Consensys Base while the Consensys software is running.
- Check out the Frequently Asked Questions (**FAQ**) for solutions to the most common problems.
- **Session:** A dataset containing data from one or more Shimmers belonging to the same **Trial**, i.e. configured at the same time.

THINGS YOU MIGHT NEED TO KNOW (2/5)

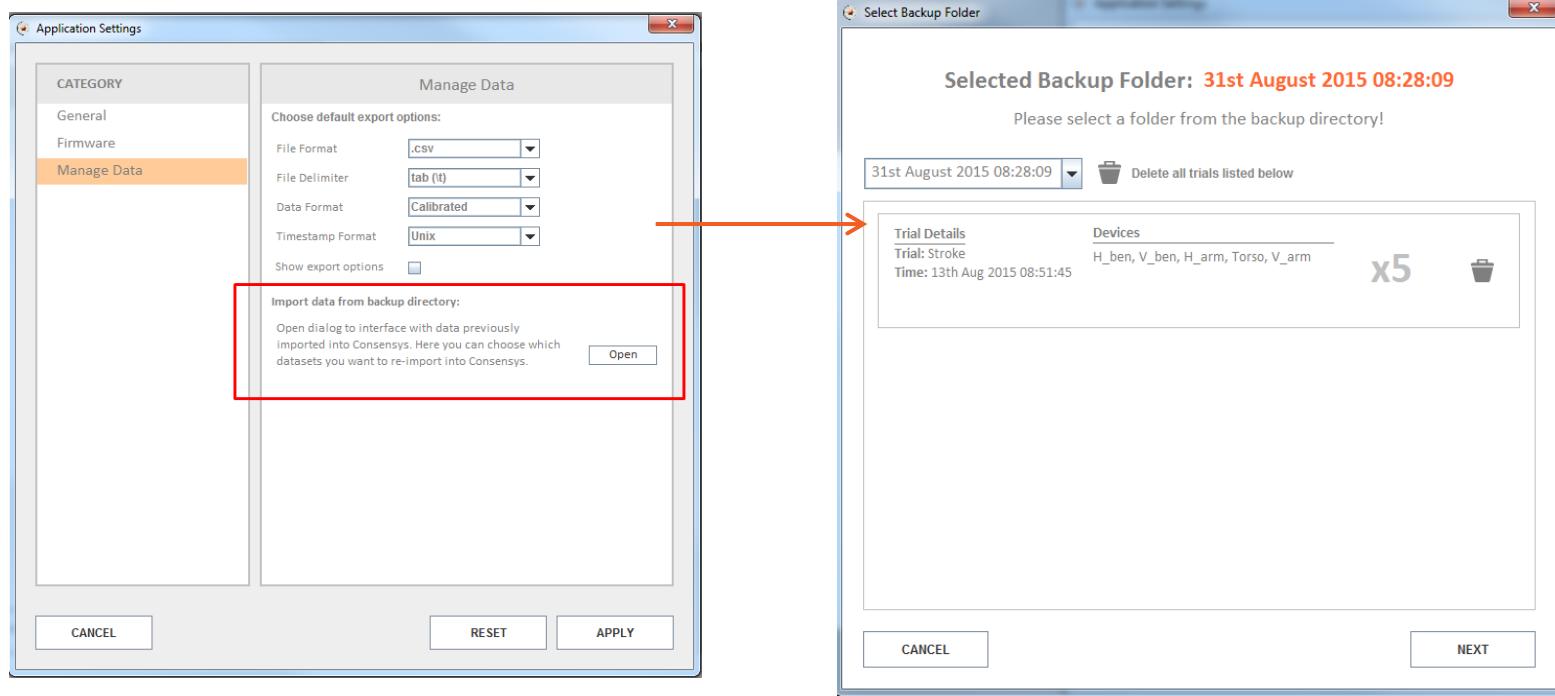
- To access the SD Card of a Shimmer inserted in a *Consensys Base*, right-click the Shimmer visualisation in MANAGE DEVICES; press “Open SD”:



- All **User Manuals / User Guides** for Shimmer hardware and software is available for download from our website. It is highly recommended that all new Shimmer users read the *Shimmer User Manual*. (<http://www.shimmersensing.com/menu/support/>)

THINGS YOU MIGHT NEED TO KNOW (3/5)

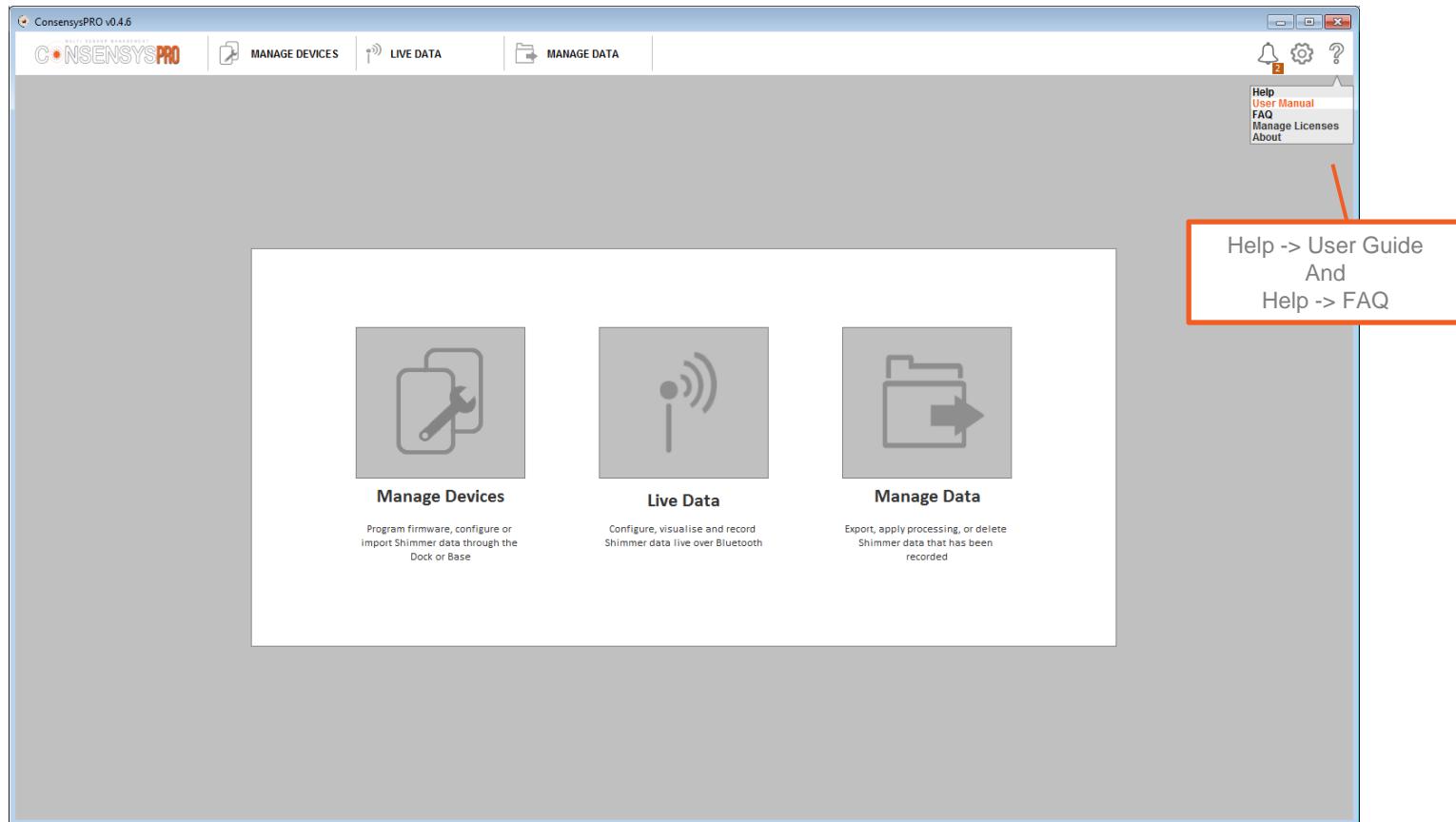
- To import data from the backup, you only need to open the *Manage Data* category in the Application Settings and click on *Open* the backup



- After selecting a backup directory and clicking *Next*, you will be direct to the second step of the import process

THINGS YOU MIGHT NEED TO KNOW (4/5)

- Consensys includes a link to this guide in the software and also a FAQ page. Please consult both documents if encountering an issue with the Consensys software or hardware



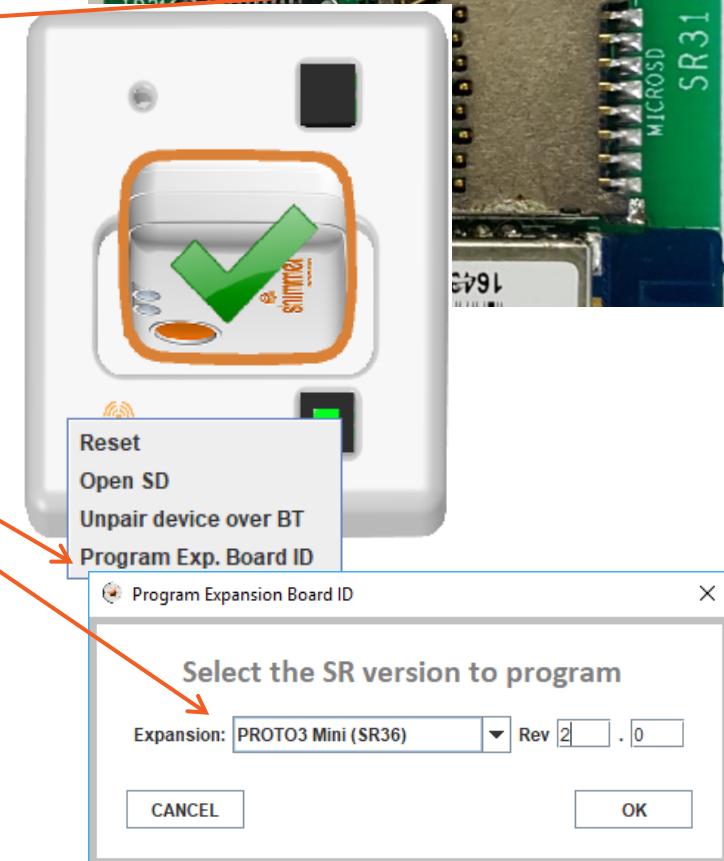
THINGS YOU MIGHT NEED TO KNOW (5/5)

PROTO3 MINI USERS

Customers attaching the Proto3 Mini to newer versions of the Shimmer3 IMU unit (*i.e.*, the SR31-7) need to update the board version for the device to function correctly in Consensys.

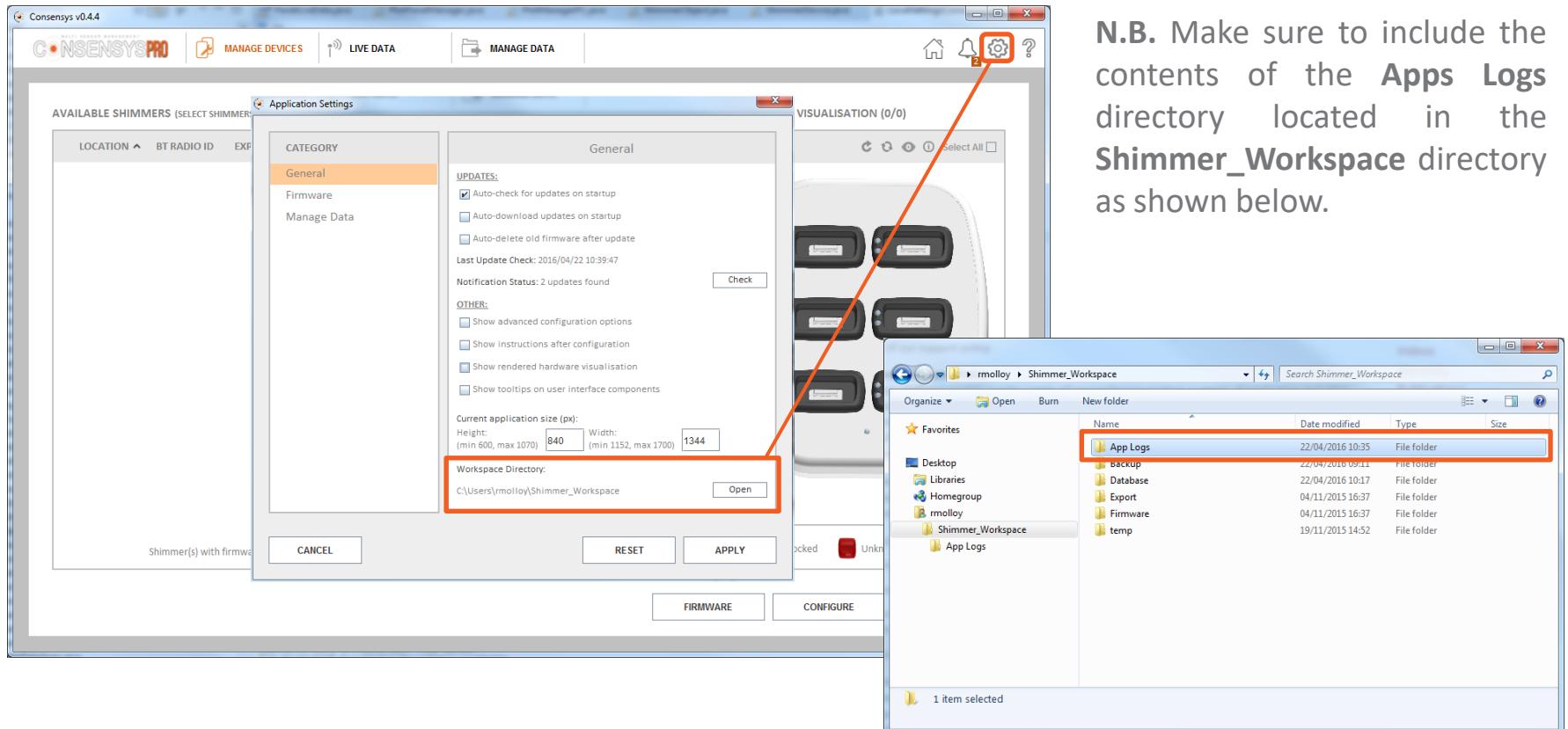
- Attach the Proto3 Mini to the SR31-7 by following instructions described in the Proto3 User Guide.
- Dock the Shimmer and program it with LogAndStream v0.10.0 (or greater).
- Hold the Ctrl+Alt+Shift keys and right click on the Shimmer image in the Dock or Base (using Consensys v1.5.0 or greater).
- Select the right click menu option titled “Program Exp. (Expansion) Board ID”.
- Select “Proto3 Mini (SR36)” from the drop-down menu, enter a Rev of “2” and click “OK”.

To return the Shimmer to normal operation if the Proto3 Mini is disassembled from the IMU, repeat the procedure but instead select the option “Shimmer3 (SR31)” from the drop-down menu and a Rev of “7”.



TROUBLESHOOTING – DOCK/BASE ISSUES

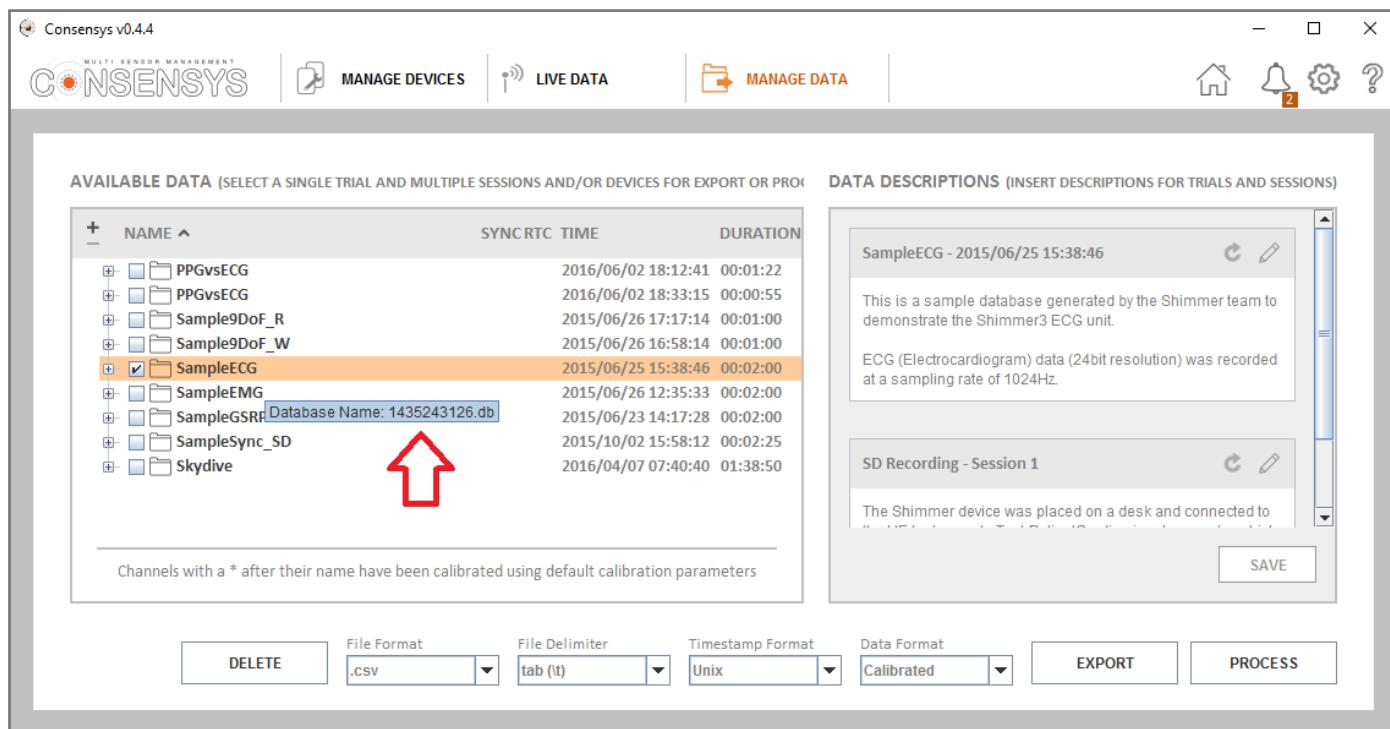
- If you experience any issue while installing or using the Shimmer Dock or Consensys Base, please consult the relevant sections of this guide and the Consensys FAQ first. If the issue has not been resolved, please submit a support query through the support section of our [website](#)¹.



N.B. Make sure to include the contents of the **Apps Logs** directory located in the **Shimmer_Workspace** directory as shown below.

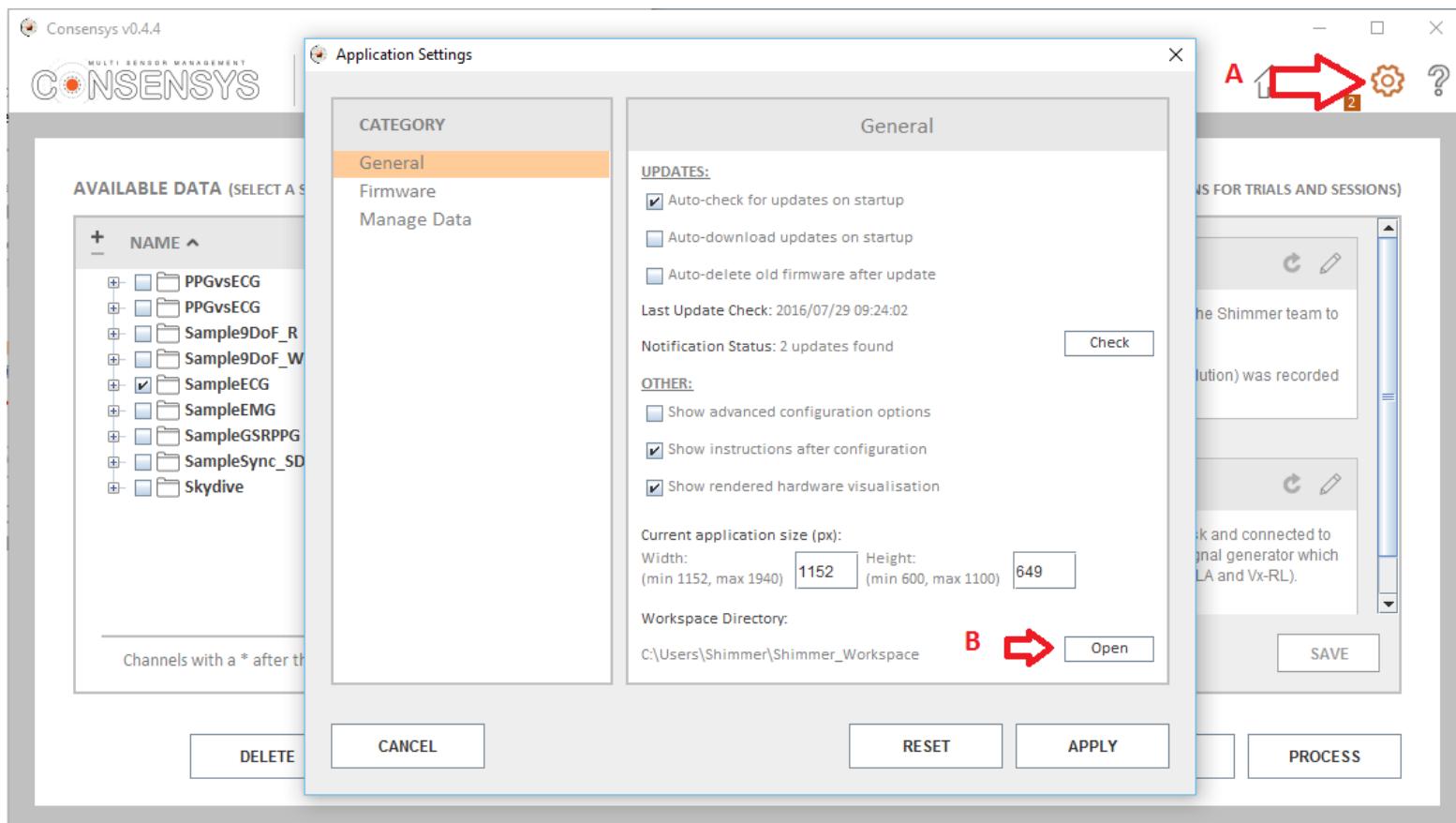
TROUBLESHOOTING – RECORDED DATA

- If you experience an error with your recorded data in Consensys ‘Manage Data’, please consult this document and the Consensys FAQs first. If the issue has not been resolved, please submit a support query through the support section of our [website](#)¹. **N.B.** please include the relevant **Database File(s)** from the Database directory and **Binary File(s)** from the Backup directory as outlined in this section.
- To identify the appropriate database file, hover your mouse over the trial in the Consensys ‘Manage Data’ tab. The file name will be a set of digits (e.g., ‘1435243126.db’) as below.



TROUBLESHOOTING – RECORDED DATA

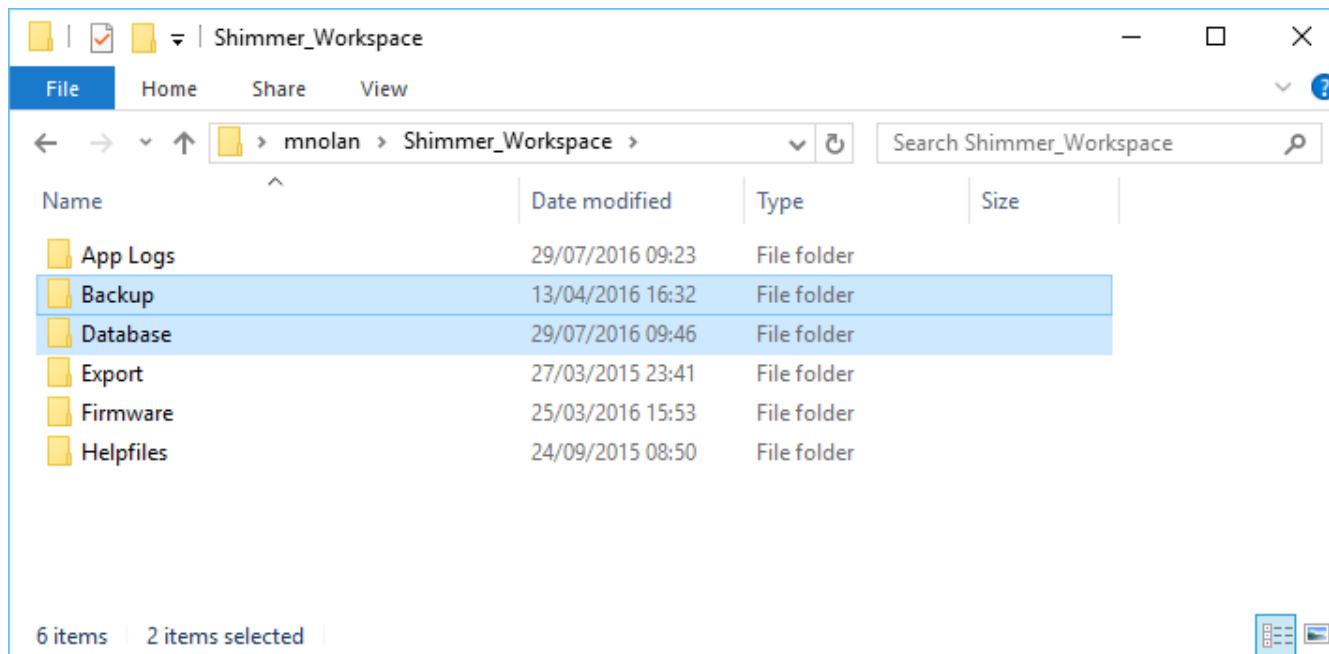
2. To navigate to the **Shimmer_Workspace** directory:
 - A. Click on the Consensys ‘Application Settings’ menu
 - B. Click on the ‘Open’ button to open the workspace directory



TROUBLESHOOTING – RECORDED DATA

3. The Shimmer Workspace will appear as below. The important directories to note are the ‘Backup’ and ‘Database’ directories - as highlighted.

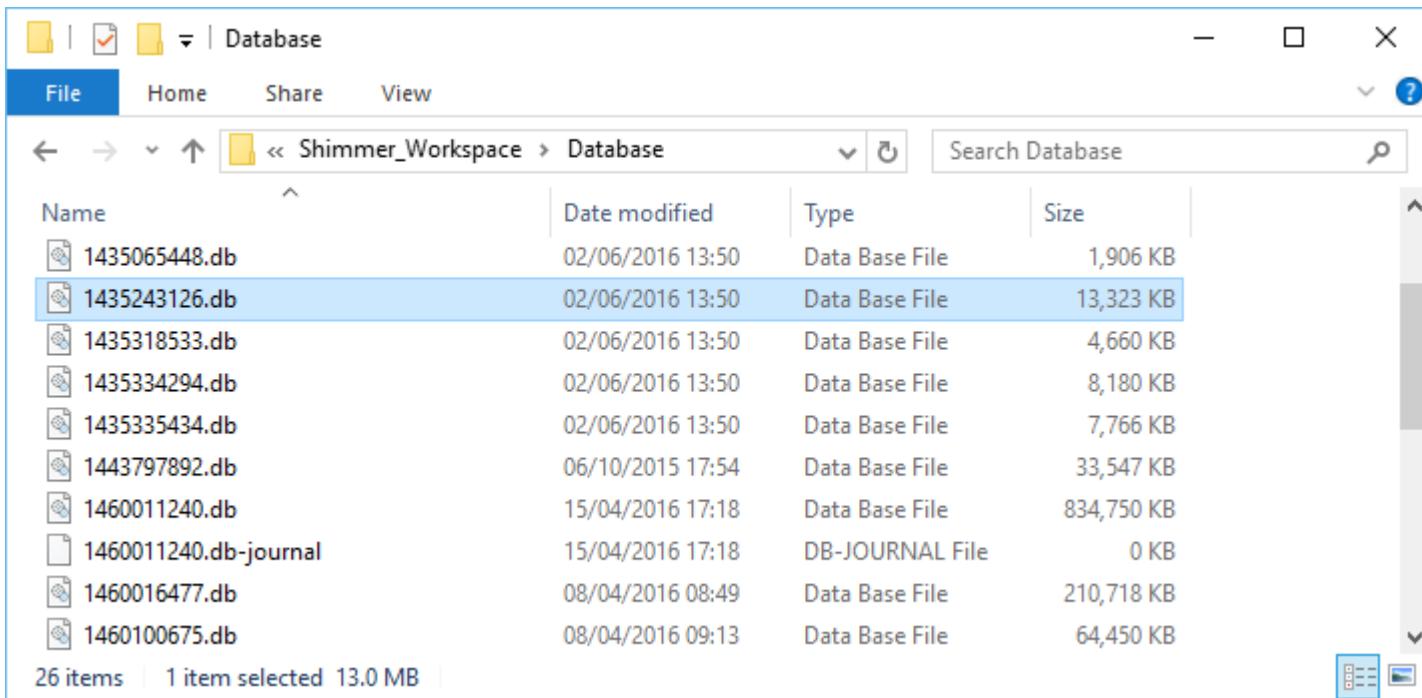
The ‘Backup’ directory is only relevant if data was imported from the Shimmer’s SD card and is not used if data is solely recorded over a Bluetooth connection.



TROUBLESHOOTING – RECORDED DATA

4. 'Database' Directory:

This directory stores a database file per 'trial' whereby the database filename is the trial configuration time in Unix Timestamp format. For example, the selected database below, '1435243126.db', corresponds to the 'SampleEMG' trial shown in step 1 which was configured on the '*25th June 2015 at 15:38.46 GMT+1*' (online converter example [here](#)).



Name	Date modified	Type	Size
1435065448.db	02/06/2016 13:50	Data Base File	1,906 KB
1435243126.db	02/06/2016 13:50	Data Base File	13,323 KB
1435318533.db	02/06/2016 13:50	Data Base File	4,660 KB
1435334294.db	02/06/2016 13:50	Data Base File	8,180 KB
1435335434.db	02/06/2016 13:50	Data Base File	7,766 KB
1443797892.db	06/10/2015 17:54	Data Base File	33,547 KB
1460011240.db	15/04/2016 17:18	Data Base File	834,750 KB
1460011240.db-journal	15/04/2016 17:18	DB-JOURNAL File	0 KB
1460016477.db	08/04/2016 08:49	Data Base File	210,718 KB
1460100675.db	08/04/2016 09:13	Data Base File	64,450 KB

26 items | 1 item selected 13.0 MB

TROUBLESHOOTING – RECORDED DATA

5. 'Backup' Directory:

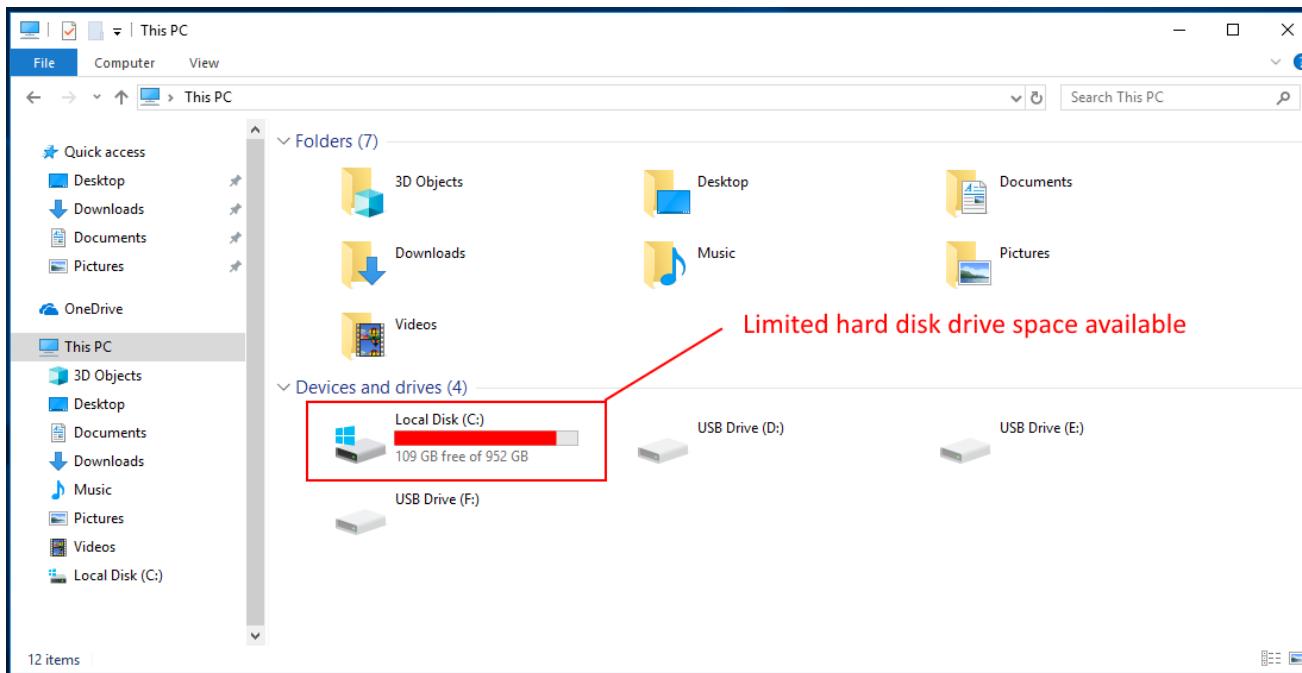
This directory contains the binary data files copied from the Shimmer during the import of data that was recorded to the Shimmer's on-board SD card. The structure of the directory is as shown below. If sending this data to Shimmer Support, it is sufficient to just identify the import date, create a ZIP of that directory and send that to Shimmer support'.

The figure displays five nested Windows File Explorer windows illustrating the directory structure of recorded data:

- Level 1: Consensys import date**
The top window shows a list of file folders with names like "2015-06-11_10.51.36", "2015-06-12_09.55.08", and "2015-06-25_10.29.10". The folder "2015-06-25_10.29.10" is selected.
- Level 2: Bluetooth MAC address per Shimmer**
The second window shows the contents of the "2015-06-25_10.29.10" folder, which includes a single file folder named "00066646b8b6".
- Level 3: 'data' directory as copied directly from each Shimmer's SD card**
The third window shows the contents of the "00066646b8b6" folder, which contains a single file folder named "data".
- Level 4: Trial name (e.g., 'Shimmer_cal1') and configuration time in Unix format (e.g., '1435224503' or 25th June 2015 09:28:23 GMT)**
The fourth window shows the contents of the "data" folder, specifically the folder "Shimmer_cal1_1435224503".
- Level 5: Shimmer name (i.e. 'Shimmer') and the recorded session number (i.e., 000)**
The bottom window shows the contents of the "Shimmer_cal1_1435224503" folder, which contains a single file folder named "Shimmer-000".

TROUBLESHOOTING – LIMITED FREE HARD DISK DRIVE SPACE (P1)

1. If recording a significant amount of data in Consensys you may find the available memory on the hard disk drive nearing capacity which will limit the ability to record further data (see below for illustration of hard disk drive nearing capacity)
2. If step 1. above is observed, Consensys datasets should be moved from the hard disk drive to a secure external location, example procedural steps to follow on the next page.



TROUBLESHOOTING – LIMITED FREE HARD DISK DRIVE SPACE (P2)

Example procedure to free-up hard disk drive space

1. Choose the Consensys datasets that you would like to archive from the ‘Manage Data’ tab.
2. Identify the dataset’s database name (a set of ten digits e.g., ‘1435243126.db’). See [page 84](#) for how to do this.
3. Locate the corresponding folder (name of the folder is same as the database name e.g., ‘1435243126’) in the ‘Database’ directory.
4. Make sure this folder has a database file (.db)
5. Move this folder safely to a secure location e.g. an external hard disk drive (Do not rename the folder.)
6. Once you restart the software, you will no longer find the dataset in the ‘Manage Data’ tab

A few points to keep in mind..

- Once archived, for your convenience maintain a document with the dataset’s details such as the trial name, database name, study details etc.
- If you would like to view the archived data in Consensys, please copy the dataset’s folder to the ‘Database’ directory of the PC running Consensys and restart the software.
- Store the archived data in secure location.

FURTHER QUESTIONS?

Why not reach out to us through our online ticketing support system?

<http://shimmersensing.com/support/wearable-sensing-support/>

Or contact us through one of our social media channels

