Sniff Science Desktop

Recording a new session:

<u>How to setup a Sniff Controller:</u>

Sniff Controller Basic - plug in the USB cable.
Sniff Controller Air - turn on the device using the switch located on the bottom of the device.

Make sure the pressure probe and other accessory equipment are plugged in and are turned on before you proceed.

For more information about initial setup, refer to the hardware manual available on the Sniff Logic website.

1. <u>Select your Sniff Controller device</u>
   From the drop-down menu, select your device
   - Sniff Controller Basic devices will appear as "BASIC COM X" (X denotes a number)
   - Sniff Controller Air devices will appear as "Air" unless designated with a different identifier
   - Note that on macOS operating system these prefix names may change.

Illustration 1 - Connecting to your Sniff Controller:
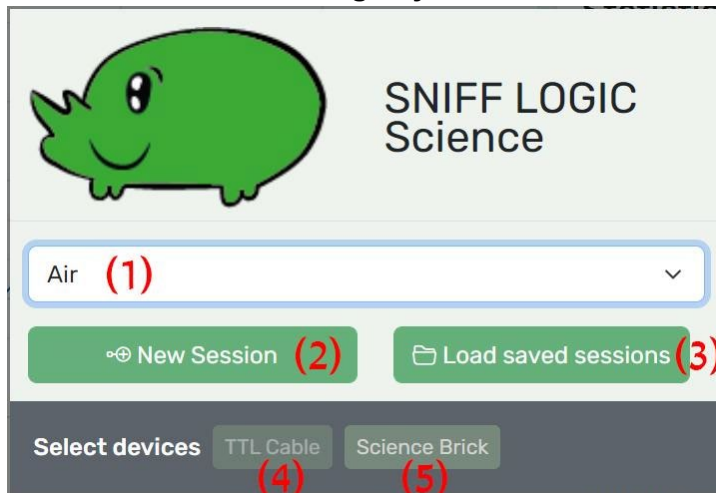
1. Dropdown menu to select from detected Sniff Controllers
2. Create a new session
3. Load and view saved sessions
4. Enable TTL cable
5. Go to Science Brick setup

Illustration 2 - Create Session menu

1. Enter participant ID*
2. Folder path for saving recorded data files
3. Select a pressure probe model
4. Select extension cord length (0m (no extension),0.5m,1m,2m,5m,10m,12m)
5. Select sampling frequency (The Sniff Controller Basic has a fixed sampling rate of 200 Hz, Sniff Controller Air can sample at either 6 or 15 Hz)
6. Enable saving of respiratory statistics (None / Inhales / Exhales / Both)
7. Select whether to start recording with, or without going through calibration first

*The ID cannot contain underscore characters ('_').

Illustration 3 - Sniff Science main screen

1. Toggle online/offline session -
   Selecting 'online' will prompt the 'create new session' recording window
   Selecting 'offline' will revert to offline analysis mode
2. Indication of the currently active Sniff Controller device
3. Start / stop button
4. Indication of recording in progress (non-clickable)
5. Save screenshot file to your computer
6. Switch between absolute (global) and relative timestamps
7. X axis - Time (Seconds)
8. Y axis - Flow (mL/second)*
9. Threshold of inhale for statistical report
10. Threshold of exhale for statistical report
11. The acquired airflow signal. Positive and negative values denote inhalation and exhalation, respectively. When data is **not** being recorded the trace is colored gray.
12. Use the text input field to log comments or events on the data. The comment is logged at the moment the 'Comment' button is clicked
13. Live-updating statistics panel. See the "Statistics" menu of this manual for further information
14. **Science Brick** settings menu (see Illustration 5)
    Note that the **Science Brick** is an optional accessory that allows you to export the signal as an analogue source that can be fed into an instrumentation amplifier.
15. Reset statistics
16. Statistics settings. See the "Statistics" menu of this manual for further information
17. Create a new session. Will bring up the "Create a new session" menu (see Illustration 1)
18. Load saved sessions. Select a folder to load all the saved sessions in it*
19. Information about the currently active Sniff Controller

Notes:

*The flow is calculated based on a general tuning curve approximated based on data from multiple participants. For individually-fit conversion use the calibration step before recording.

** When loading a folder, the individual files are not visible, although choosing a folder will load and display them.

Illustration 4 - statistics settings

Statistics settings:

1. Metrics - select the measurements you want to be calculated. You can toggle multiple options.
2. Thresholds used for calculation of statistics. The selected thresholds will appear as dashed lines in the main data collection screen
3. Calculation window for statistics.
4. Select on which Nasal Holter data channel to calculate statistics (Enabled only for Nasal Holter units)

   ● Note that the statistics are updated every ~1 second, regardless of the width of the calculation window.

Illustration 5 - Science Brick settings
The Science Brick sends triggers to external devices based on a set of pre-defined thresholds. The triggers can be customized for a variety of durations and forms. Further, you may send triggers at the onset or offset of the event.


Science Brick Management:

General note – refer to the illustration on the next page for help on terminology of triggers in respect to respiratory phase

1. Select the Brick's serial port - note that Sniff Controller Basic units also house a COM port and will be visible in this dropdown menu.

   IMPORTANT! When a Science Brick's correct COM port is selected, it will begin flashing the green LEDs when triggers are sent. This is a good way to verify the correct COM port was selected.

2. The threshold value for Inhale trigger
3. The threshold value for Exhale trigger
4. Trigger duration (in seconds) when for Inhale onset
5. Trigger duration (in seconds) when for Inhale offset
6. Trigger duration (in seconds) when for Exhale onset
7. Trigger duration (in seconds) when for Exhale offset
8. A multiplier for the amplitude of the analogue data-out signal
9. Define the Nasal Holter channel (Enabled only for Nasal Holter units)

Illustration 6 - triggering events off of the respiratory cycle
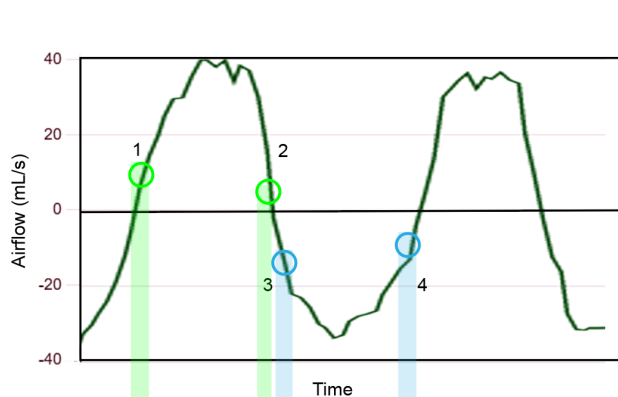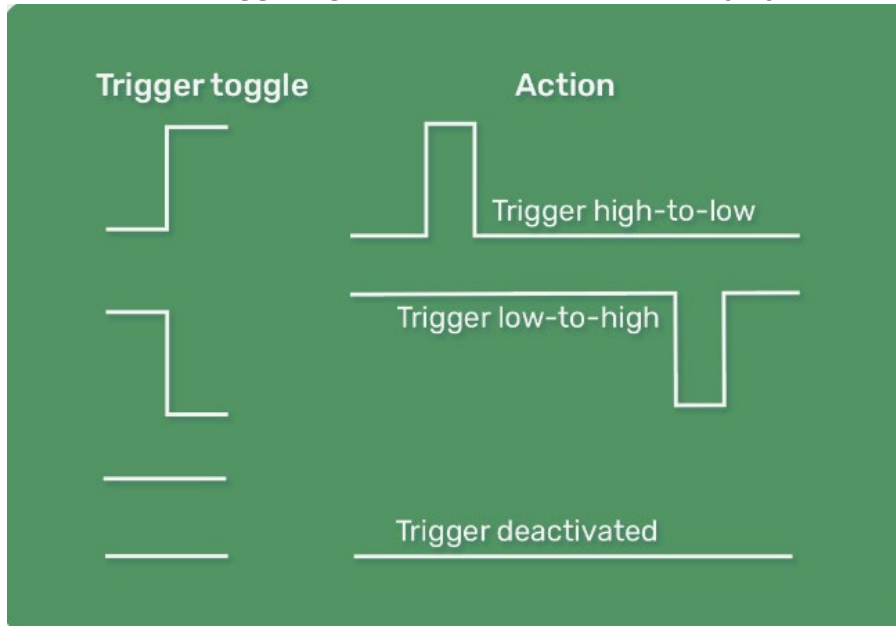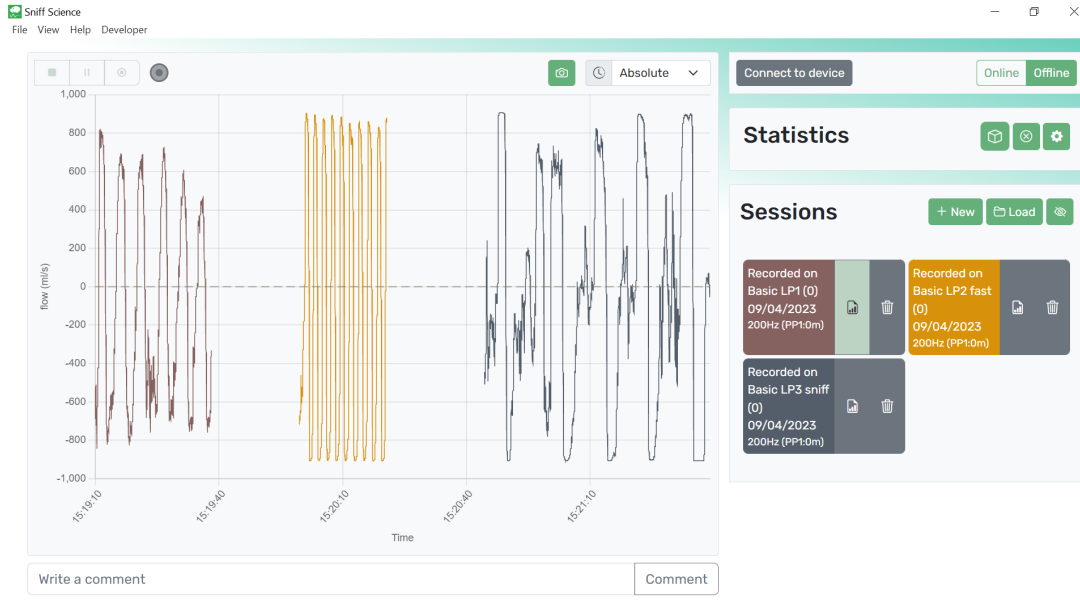

Values selected in
this illustration

○ 1. Inhale onest (e.g. +10 mL/s)
○ 2. Inhale offset (e.g. +5 mL/s)
○ 3. Exhale onset (e.g. -17 mL/s)
○ 4. Exhale offset (e.g. -10 mL/s)
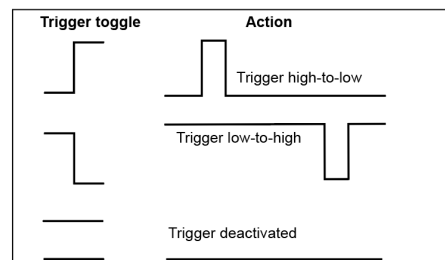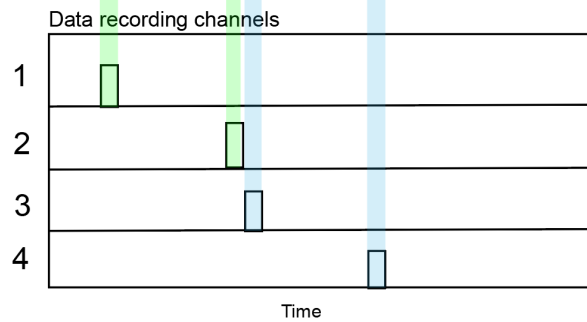
FOR MORE INFORMATION REFER TO THE APPENDIX AT THE END OF THIS MANUAL

Illustration 7 - analysis (view) mode

While in analysis mode, multiple data files can be loaded and viewed simultaneously. Selecting the 'Absolute' timing will present the data in respect to the actual time they were acquired (hence the gaps between the traces). Switching to 'Relative' time will superimpose the files on top of each other.

Appendix: Working with the Science Brick

The Science Brick is used for real-time exporting of data to instrumentation amplifiers, and generation of external triggers off the respiratory trace, for example, a trigger on inhalation onset or offset or a trigger on exhalation onset or offset.

What does it come with: The Science Brick comes with a cable allowing you to connect it to your computer's USB-A port.

What else will I need in order to use this:
1. A Sniff Logic acquisition device, either Sniff Controller Basic, Sniff Controller Air, or a Nasal Holter.
2. A computer, desktop or laptop, with a USB-A port.
3. BNC cables to link to instrumentation amplifier and other external devices

Description: The Science Brick is a scientific research instrument. Using the SniffScience software, it allows you to export the respiratory signal as an analogue signal ($\pm 5V$), via BNC connectors, to an instrumentation amplifier.

You can use a Sniff Controller Basic connected to the computer via USB, or a Sniff Controller Air and Nasal Holter connected to the computer via Bluetooth. The SniffScience software will acquire the signal from the device, and export it via the Science Brick. This can allow saving respiratory data time-locked to other signal acquisitions, such as EEG.

The Sniff Science software allows you to select points on the respiratory trace to act as triggers. When these points are materialized in the data, this generates a TTL trigger, that you can select as either pull-up or pull-down. This feature can be used in diverse settings. For example, in olfaction research you can have an olfactometer trigger an odor exactly at sniff onset. In emotion research you can present a stimulus at different phases of the respiratory trace, on inhalation, exhalation, or anywhere in between. The Science Brick has four independent trigger lines, all with BNC connections.

Setting up the Science Brick:

If you plan on using the Brick in your experiment, it should be set up prior to launching the software.

1. Make sure the switch located at the side of the Science Brick is always ON.
2. Connect the Science Brick to a USB port. This should be accompanied by the operating system chyme sound similar to detection of other USB devices (e.g. thumb drives etc.). The system will allocate a COM port for the Science Brick.

NOTE: If you are using A Sniff Controller Basic, by now you should have it connected via USB as well. Notice that the Sniff Controller is allocated a different COM port than the Science Brick.

3. Launch SniffScience Desktop
4. Start a new recording session.
5. Go To the 'Manage Brick' window.
6. Select the Science Brick's serial port from the dropdown menu.

IMPORTANT! When a Science Brick's correct COM port is selected, it will begin flashing the green LEDs on the front panel when triggers are sent. This is a good way to verify the correct COM port was selected.

If for any reason you need to restart any of the components (hardware or software), it is advised to repeat steps 1-6 in order to ensure the Science Brick will function properly.