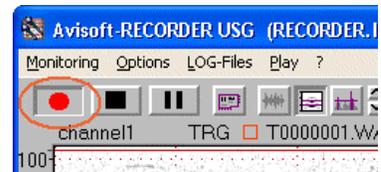


Recording Ultrasonic Vocalizations (USV)

See print manual for more information

Data Acquisition:

- 1) Turn on both computers in each room. **Do NOT run RECORDER until step 7.** If in doubt, see Figure 4.
- 2) To toggle between computers, double-tap the scroll lock key.
- 3) Turn on both USB audio interfaces in each room (located on top of CAR boxes or behind the monitor) and push the “48V On” button on top of each hub (Fig. 3).
- 4) Double click the “EMU 404 Audio Interface” icon on the corresponding desktop.
- 5) In the “Sampling frequency” drop-down menu, select 192 kHz.
- 6) Select the other device in the “Device” drop-down menu and repeat step 5.
- 7) Double click the “Recorder” icon on the desktop. 
- 8) Select “Options→Configuration...” or click the Configuration button on the toolbar (Fig. 1).
- 9) If necessary, open a new configuration file by clicking “Open...” in the Config. File frame. Otherwise, ensure that the correct save directory is selected in “Base Directory”. Other parameters you may wish to change include:
 - a. Recording length next to the “Trigger” drop-down menu
 - b. Filename format via the “Filenames” button
 - c. Maximum recording time per file via the “Maximum file size” text field
- 10) Click OK when you are satisfied with the configuration settings.
- 11) Toggle to the MED-PC computer and set up a MED-PC session as usual (see *Conditioned Avoidance Response (CAR) Boxes*).
- 12) When you are ready to begin recording, toggle back to the USV computer and click the record button (Fig. 2).
- 13) If batch mode has been activated via “File Name Options” (see step 9b), a prompt will display asking you how to name each data file (A preview of the filenames appears at the bottom of the prompt). Once you click OK, recording will start.



14) Click the stop button to end recording. If you are using a permanent (limited) trigger, the recording will automatically stop after a period of time you specify.

NOTE: If you will be using the USV system over several consecutive days, you may leave the USB audio interfaces on at the end of each day. In doing so, you may skip steps 3-6 the next day and begin by starting RECORDER.



Figure 3-USB interface activation



Figure 4 - Confirm these settings

Do not change

The screenshot shows the 'Configuration' dialog box with several settings highlighted by red boxes and arrows. The 'Channel Settings' table is highlighted, as is the 'Trigger' section (set to 'permanent (limited)' with a '60 min' delay), the 'Base directory' (set to 'C:\Documents and Settings\BIOBSERVE Gm...'), and the 'Input Device Settings' (set to '192000 Hz' sampling rate). Red arrows point from the text 'Do not change' to these highlighted areas. A vertical red line on the right side of the dialog box is labeled 'Adjust accordingly'.

Device	Channel	Name	Active	Threshold	Range	Pre-trigger	Min	Hold
E-MU 0404 USB	1	channel1	X	10.0	0.000-250.000	0.0	0.0	1.0
E-MU 0404 USB	2	channel2	X	10.0	0.000-250.000	0.0	0.0	1.0
E-MU 0404 USB (2)	1	channel3	X	10.0	0.000-250.000	0.0	0.0	1.0
E-MU 0404 USB (2)	2	channel4	X	10.0	0.000-250.000	0.0	0.0	1.0
E-MU 0404 USB (2)	1	channel5	-	10.0	0.000-250.000	0.0	0.0	1.0
E-MU 0404 USB (2)	1	channel6	-	10.0	0.000-250.000	0.0	0.0	1.0
E-MU 0404 USB (2)	1	channel7	-	10.0	0.000-250.000	0.0	0.0	1.0
E-MU 0404 USB (2)	1	channel8	-	10.0	0.000-250.000	0.0	0.0	1.0

Device: 2 E-MU 0404 | USB 1.0 Channel: left Active
Name: channel1 Current file number: 16 Increment
Trigger: permanent (limited) 60 min Autotransfer to SASLab Wait for Avisoft SASLab
Trigger Event Level: 10 % Energy Range: 0 - 250 kHz Entropy < 35 %
Base directory: C:\Documents and Settings\BIOBSERVE Gm ... Display Settings Display: spectrogram
Input Device Settings Device: 2 E-MU 0404 | USB 1.0 Sampling rate: 192000 Hz Buffer: 0.200 s
Format: 16 bit Number of Buffers: 4 Range: 40 % 250 kHz FFT length: 256 Resolution: 750 Hz Enlarge y axis by: 1
Gate with: nothing ! Maximum file size: 30 min Save the active channels of each device into a single multichannel file (no separated triggering)

Adjust accordingly

Data Analysis:

NOTE: The USB audio interfaces do not need to be on for analysis. Analysis and recording can run simultaneously.

- 1) Double click *SAS LabPro* on the desktop.
- 2) Ensure that the correct configuration has been selected by checking the title bar **before opening any files**.
 - a. If the correct configuration is not currently selected, select *File*→*Configuration*→*Open...*
 - b. Select the correct configuration (configuration files contain the extension “.ini” are stored in *My Documents/Avisoft Bioacoustics/Configurations/SASLab*).
- 3) To analyze several files at once:
 - a. Select *Tools*→*Batch Processing*
 - b. Ensure that “Automatic parameter measurements” has been selected in the drop-down menu.
 - c. Click *Files...*
 - d. Select the files you wish to analyze (click and shift-click to select multiple files)
 - e. Click *Start*
 - f. Data analysis may take several minutes to upwards of an hour, depending on the size and number of files you select. When complete, a table will appear displaying summary data for each file analyzed (This is **not** the large table that may initially appear under the window “Automatic Parameter Measurements”, but rather the smaller table titled “Class Count Statistics”). This table can be saved as a .txt file and/or copy-pasted into a spreadsheet. **If you click OK before saving or copying the table, the table will be lost and you will need to reanalyze the data to get it back.**
- 4) To analyze a single file:
 - a. Select *File* →*Open...* and locate the file you wish to analyze.
 - b. Select *Analyze* →*Create Spectrogram* or click the “Create Spectrogram” button on the toolbar.
 - c. A spectrogram window will generate as well as a table displaying data for individual calls. This table can be copied by clicking the “Copy to clipboard” button on the toolbar (labeled 17.1) and pasted into a text file or spreadsheet.

Analysis configurations

Default: Counts Band1 (20-32 kHz) and Band2 (45-70 kHz) vocalizations

Band Classification: Counts short (≤ 0.05 s), long (> 0.05 s and ≤ 3000 Hz), and frequency-modulated USV (> 0.05 s and > 3000 Hz) with minimum frequencies of 23 kHz.

Troubleshooting

Recording

One or more boxes are not detecting sounds

- Ensure that the USB interfaces have been turned on and that the “48V On” LED is lit up.
- Ensure that the 2 volume dials on either side of the “48V On” button have not been turned down significantly (It is OK if they are not at the exact same level).
- Open the Configuration window and ensure that all 4 channels are active (see Fig. 4).

The data files are missing or appear to be truncated

- Ensure that the files are set to be saved to the correct location in the Configuration window.
- Check the “Maximum file size” in the bottom-right corner of the Configuration window. If a recording session exceeds the maximum file size, any data recorded after this length of time will be saved to a separate file.
- Check the hard drive space*. Data will not be saved if the computer is out of memory.
- Ensure that the “Pause” button is not depressed during recording.

Analysis

The program appears to have frozen

If analysis is running, this is normal behavior even if the title bar says “Not Responding”. However, if it stays this way for a long time, first check the hard drive space to ensure that it is not consuming too much memory*. If it is consuming a large amount of memory, shut down the program via ctrl-alt-del and restart analysis.

No summary table appears after batch processing is complete

The automatic parameter measurements have not been set correctly. In the Spectrogram Window, click the “Automatic parameter measurements setup button” and ensure that the checkboxes next to “Enable automatic measurements” and “Compute parameters from entire spectrogram” are checked.

Batch processing produces repeating data (exact same values for every subject)

This problem is caused by an occasional program glitch. At this point, the only solution is to reanalyze the data and hope it doesn’t happen the next time.

*To check the amount of space on the hard drive, open My Computer on the desktop. Then right-click on C: and select “Properties...”