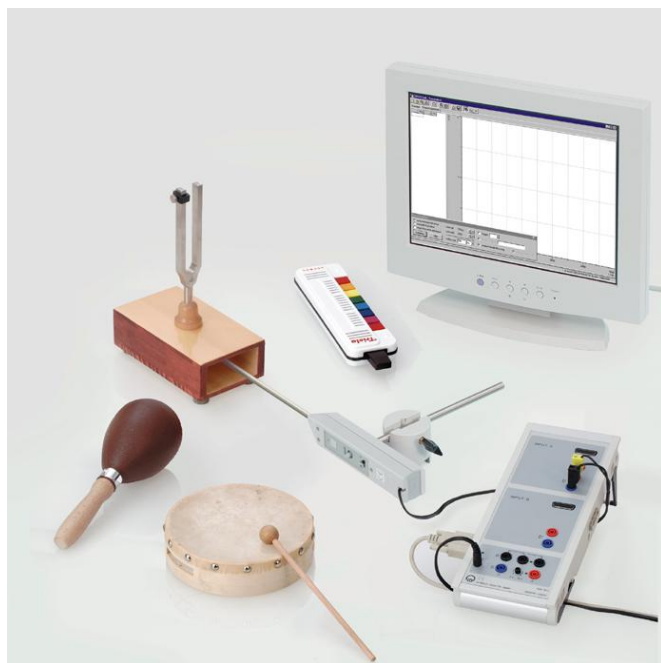


Acoustics
Detecting and recording sound

Tones, sound, noise and pops – Recording using Sensor-CASSY

Object of the experiment

1. Demonstrating the characteristic oscillograms of sound, combination sound, noise, and bang

Setup**Preparing the Sensor-CASSY:**

- Connect the Sensor-CASSY to the serial interface (or the USB) of the computer, and connect the microphone to A (U)
- Get the CASSY-Lab software started.
- Load the example "Sound analysis" (P 1.7.7.4).
- Change the measuring parameters as follows:

Tuning fork, harmonica, maraca:

Interval: 10 μ s

Measuring Time: 5 ms

Repeating Measurement: switch off

Tambourine:

Interval: 20 ms

Measuring Time: 1 s

Trigger: switch on

Trigger voltage: 0.1 V, rising

Repeating Measurement: switch off

Microphone settings:

Output signal: ~

Gain: medium

Battery: maximum charge is required ($U \approx 9$ V).

While the oscillograms are recorded, work at the "Standard" screen level.

Apparatus

| | |
|----------------------------------|---------|
| 1 Multi-purpose microphone | 586 26 |
| 1 Resonance tuning fork..... | 414 42 |
| 1 tambourine | 414 32 |
| 1 Sensor-CASSY 2..... | 524 013 |
| 1 CASSY Lab 2 | 524 220 |
| 1 Saddle base | 300 11 |

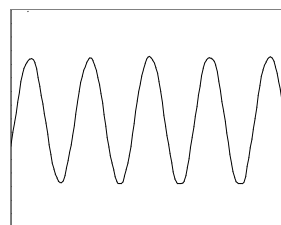
Carrying out the experiment

Remark:

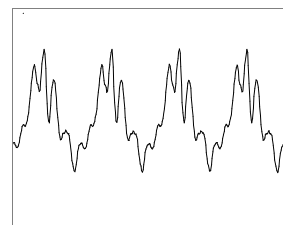
The harmonica gives the neatest oscillograms at high frequencies.

The characteristic oscillogram of a bang is obtained by holding the parchment of the tambourine while it is struck. This avoids other oscillations of the parchment, which would interfere with the experiment.

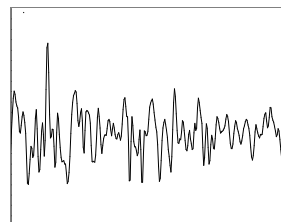
- Strike the tuning fork, and start the measurement with the Sensor-CASSY.
- Observe the oscillogram on the screen, and save it if desired.
- Proceed in the same way with the harmonica and the maraca.
- In the case of the tambourine, start the measurement before striking.

Observation

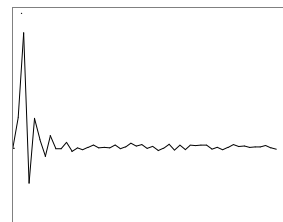
tuning fork



harmonica



maraca



tambourine

Evaluation

When a tuning fork is struck, a sound is produced. The sound is a periodic, sinusoidal oscillation.

When a harmonica is blown, a combination sound arises. A combination sound is a superposition of several sounds, i.e. a superposition of several periodic, sinusoidal oscillations, which add up to form a non-sinusoidal, periodic oscillation.

When a maraca is moved, a noise is generated. The noise is a non-periodic and non-sinusoidal oscillation.

When a tambourine is struck, a bang is produced. A bang is an oscillation of large amplitude which dies away quickly.

Remark:

By changing to the "Frequency Spectrum" screen level, the frequency spectra of sound and combination sound can be compared with each other.