

Acoustics
Detecting and recording sound

Tones, sound, noise and pops – Recording using an oscilloscope

Objects of the experiment

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

Setup**Oscilloscope settings:**

Trigger: AC

Voltage gain: 0.2 V/cm

Metallophone, harmonica, maraca:

Time base: 0.2 ms

Tambourine:

Time base: 5 ms

Microphone settings:

Output signal: ~

Gain: medium

Battery: maximum charge is required ($U \approx 9\text{ V}$).**Apparatus**

1 Multi-purpose microphone	586 26
1 Resonance tuning fork.....	414 42
1 Tambourine	414 32
1 Adapter BNC/ 4 mm, 2-pole	575 35
1 Saddle base	300 11

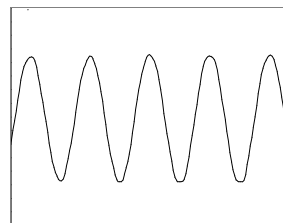
Carrying out the experiment

Remark:

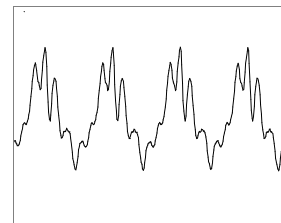
The metallophone and the harmonica give the neatest oscillograms at high frequencies.

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.

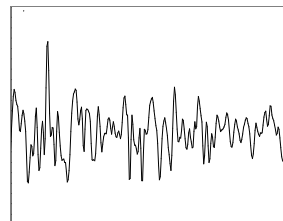
- One after another strike the metallophone, blow the harmonica, shake the maraca, and strike the tambourine.
- Observe the oscillograms.

Observation

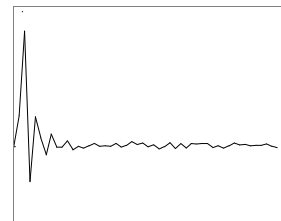
metallophone



harmonica



maraca



tambourine

Evaluation

The sound is a periodic, sinusoidal oscillation, which arises when the metallophone is struck.

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. This is observed when the harmonica is blown.

The noise is a non-periodic and non-sinusoidal oscillation. It arises when the maraca is shaken.

A bang is an oscillation of large amplitude which dies away quickly. It can be produced by striking a tambourine.