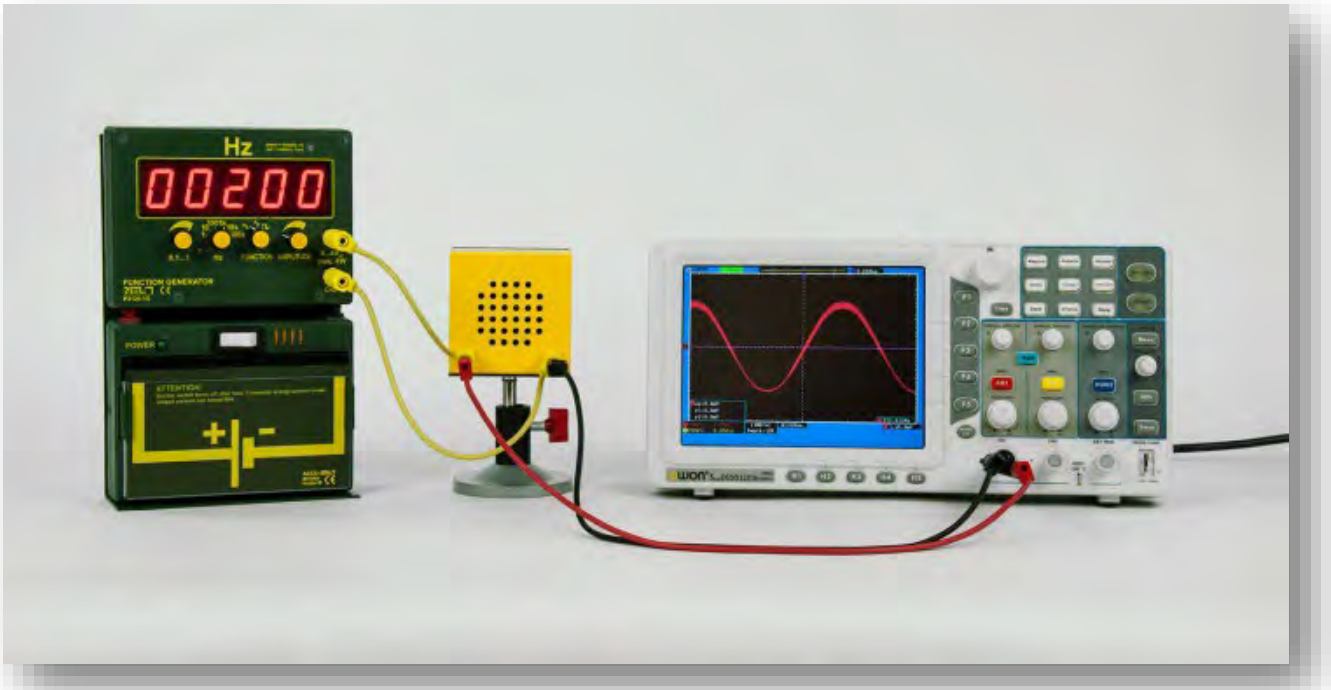
MEASURING FREQUENCY USING THE OSCILLOSCOPE

AKD 01.12b



Material:

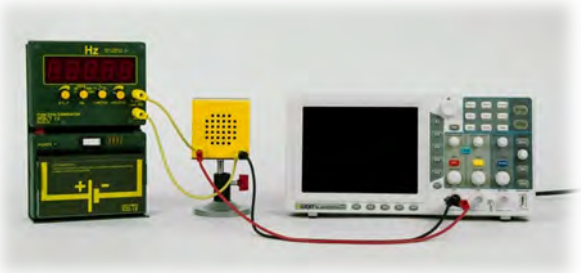
Item Code	Qty	Description
DE751-3A	1	Oscilloscope, two-channel, 30 MHz, with VGA
P3120-1B	1	Rechargeable battery, "inno", 6V/10 Ah
P3120-4A	1	L-shaped assembly platform
P3120-1G	1	Function generator with digital display "inno"
DG507-12	1	Safety connecting lead, 12,5 cm, yellow
DG507-25	1	Safety connecting lead, 25 cm, yellow
DG505-25	1	Safety connecting lead, L=25 cm, red
DG504-25	1	Safety connecting lead, L=25 cm, black
DS085-1R	1	Round base with stand tube, uni
MB240-1LS	1	MBC Loudspeaker with nose

MEASURING FREQUENCY USING THE OSCILLOSCOPE

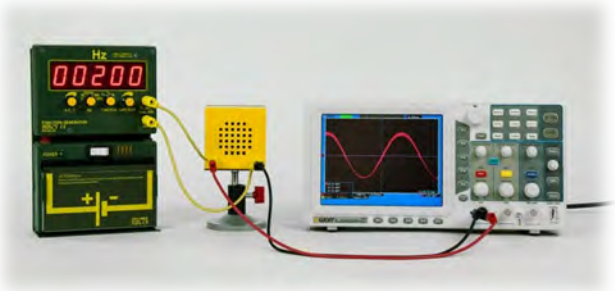
AKD 01.12b

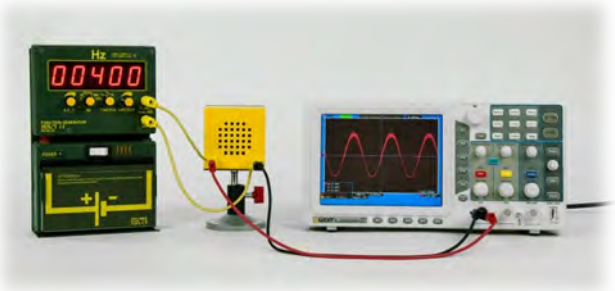
Goal:
Demonstrate the function of an oscilloscope and learn the necessary steps for a calculation of the frequency.

Setup:
The function generator is connected in parallel to the loudspeaker and the oscilloscope.



Experiment:
The function generator is used to generate oscillations (set sinusoidal oscillation) of a certain frequency, which are audible as tones in the loudspeaker and visible as oscillation curves on the oscilloscope. The number of full oscillations is determined and set in relation to the number of boxes. This is also done for a second frequency.





Result:
The frequency is calculated from: Number of oscillations/time required
With a time deflection of 5 µs and N oscillations, the following applies:

$$f = \frac{N}{t} \rightarrow f = \frac{Oscillations}{Time\ deflection * \ Box\ count}$$

Likewise, the frequency can also be determined from the time period T for only one oscillation (= oscillation period):

$$f = \frac{1}{T}$$

Note:
Setting the oscilloscope: The horizontal axis is the time axis. A full box corresponds to the set time unit, e.g. 5 µs. The channel used (here CH1) must be adjusted to the amplitude of the oscillation so that the graph fits into the picture.

If the graph cannot be read exactly from the boxes, you can use the "horizontal position" slider to move the graph appropriately. Here it is not important where the graph is drawn, but how long the oscillations last.