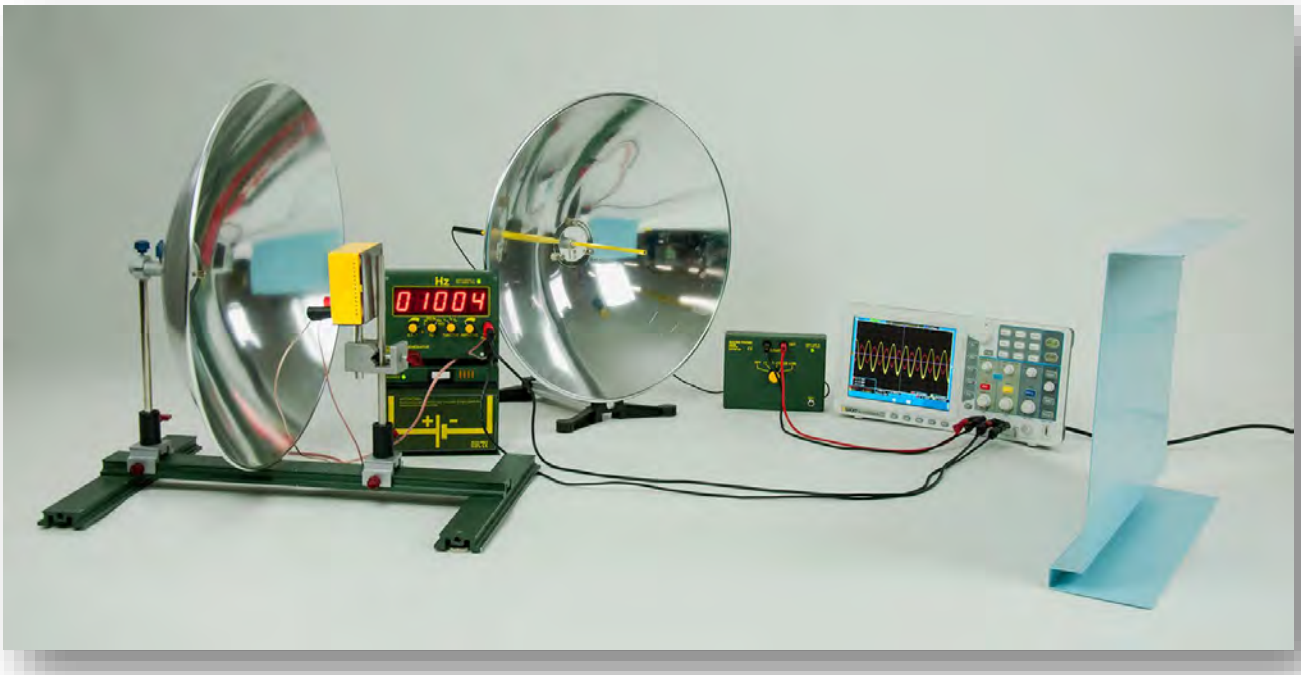
REFLECTION OF SOUND - SONAR

AKD 05.08



Material:

Item Code	Qty	Description
DS101-1G	1	Support base, large, L=500 mm
DS090-3K	1	Claw base "Sepp", 260 x 220 mm
DW340-2M	1	Measuring microphone "inno"
DE751-3A	1	Oscilloscope, two-channel, 30 MHz, with VGA
DT710-1P	2	Parabolic mirror, D=460 mm
DT710-2H	2	Holder for parabolic mirror, on support
DS093-04	3	Sliding saddle "Sepp", H=40 mm
MB240-1LS	1	MBC Loudspeaker with nose
DS617-1H	1	Holder for MBCs "compact"
P7240-1C	1	Support rod, round, L=250 mm, D=10 mm
DS095-3K	1	Bosshead cross-pattern, demo 03
P3120-4A	1	L-shaped assembly platform
P3120-1G	1	Function generator with digital display "inno"
P3120-1B	1	Rechargeable battery, "inno", 6V/10 Ah
DG520-1E	1	Connecting lead, double, 100 cm
DS615-1P	1	Metal plate for MBC system, 50 x 35 cm
	4	Connecting lead

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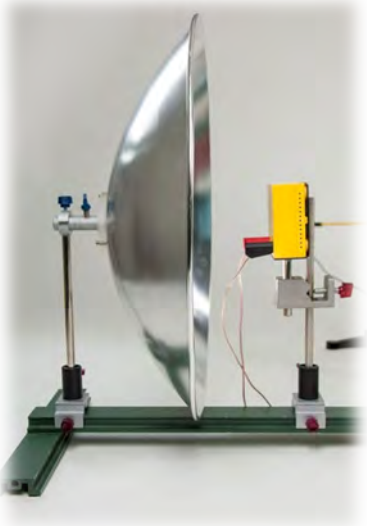
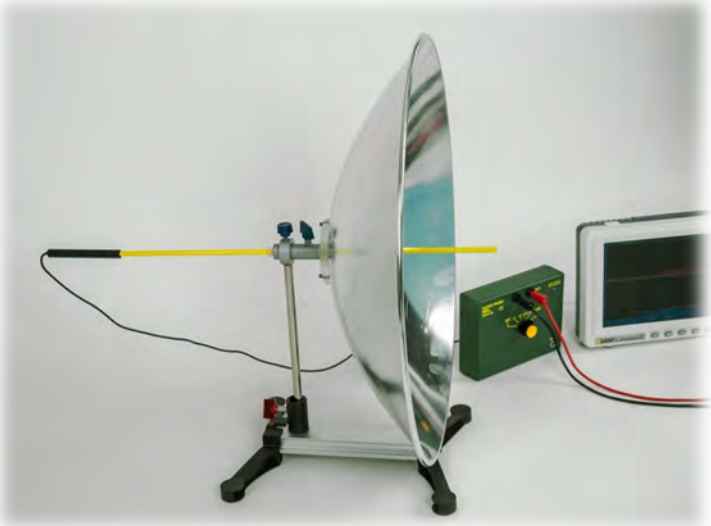
Goal:
If sound is reflected from a distance, a phase shift occurs.

Setup:
A parabolic mirror is fixed to its holder at the end of the support base using a sliding saddle. Make sure that the mirror does not come into contact with the support base. A support rod is fixed in a second sliding saddle, onto which the module holder is fixed with a bosshead. The loudspeaker is connected to the function generator by the double cable and placed on the module holder. This construction is positioned on the support base in such a way that the loudspeaker is in the focal point of the mirror (about 19 cm from the surface).
The other mirror is fixed with its holder in the "Sepp" claw base. Again, make sure that the mirror does not touch the claw base. The measuring microphone is pushed through the mirror into the focal point. The microphone is connected to the oscilloscope. Two channels are used on the oscilloscope. The second channel is connected to the function generator. The measurement range for channel 1 is 100 mV, for channel 2 it is 10 V and the time resolution is 500 µs. The amplification factor of the microphone is 30.
The assembly plate is placed on one side of the table and the two stand feet are aligned so that they are at the same angle to the plate.





Experiment:
A frequency of 1000 Hz is now set on the function generator and the plate is moved. The graphs on the oscilloscope are observed.

Result:
The graph of channel 1 shows the largest amplitude when the plate is at a suitable distance. Through the second channel you can clearly see the phase shift between the loudspeaker signal and that from the microphone. The phase shift corresponds to the travel distance of the sound.