

Velocity of Sound Kit
IPC-4805

Introduction.

This equipment is designed to allow the measurement of the velocity of sound in air using a loudspeaker, a microphone, a signal generator and an oscilloscope.

Operation.

Connect the output of a signal generator to the loudspeaker terminals and also to one input of a dual channel oscilloscope (make this the trigger channel).

Next using a screened (coaxial) cable connect the output of the microphone to the second input of the oscilloscope.

Now place the loudspeaker and the microphone facing each other (approx. 10cm apart) and switch on the signal generator (set to sinewave) and adjust the amplitude to an acceptable volume. Then adjust the frequency to approx. 3kHz, once the waveform from the microphone can be seen on the oscilloscope slowly adjust the frequency above and below 3kHz to get the point of maximum signal (this variation is due to the response characteristics of the microphone).

Next move the microphone so that the two waveforms are in phase with each other and mark the position of the microphone. Now slowly move the microphone away from the loudspeaker until a 360 degree phase shift has been achieved, as displayed on the oscilloscope screen. This can be done with both waveforms displayed simultaneously or with the oscilloscope set in the X-Y mode. The simultaneous display method allows students to see the actual phase shift of the microphone output as the microphone moves.

Finally measure the distance between the new position and the original position of the microphone. The difference between the two is equal to one wavelength of the sound.

The velocity of sound can then be calculated using:-

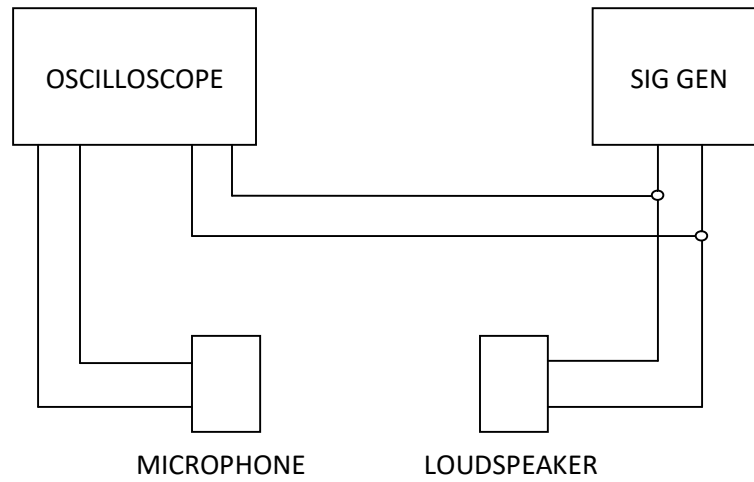
$$V=f\lambda$$

where: v is the velocity of sound in metres per second.
 f is the frequency of sound in hertz.
 λ is the wavelength of sound in metres.

See Next Page for Setup:-

(Cont.)

Velocity of Sound Apparatus Setup



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This kit contains:-

- 1 x loudspeaker IPC-4678-W
- 1 x microphone IPC-4220-W