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Inexpensive Ultrasonic Interferometer¹ JOHN GROSSMANN, OLEKSIY SVITELSKIY, Colgate University, Hamilton, NY 13346, ALEXEY SUSLOV, National High Magnetic Field Laboratory, Tallahassee, FL 32310 — Growing interest of small universities and colleges in research determines an increasing need in affordable laboratory equipment that would be capable of producing scientifically valuable experimental results. In this report we present the current status of our efforts to develop a simple and low-cost version of a classical experimental setup for ultrasonic pulse-echo measurements that would be easily reproducible in the electronics shop of any small educational institution. In particular, usage of a dual timer microchip LM556 allowed us to simplify the design of a probing pulse generator. Also, we propose that using modern broadband RF components in phase detection circuits will allow us to substitute the complicated and expensive superheterodyne design of receiver with the technique of direct transformation and analysis of the echo signal right at the probe frequency. Our analysis shows that these simplifications can be achieved without compromising for sensitivity of the experiment or precision of measurements.

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