Hydrophone:
Operation Manual

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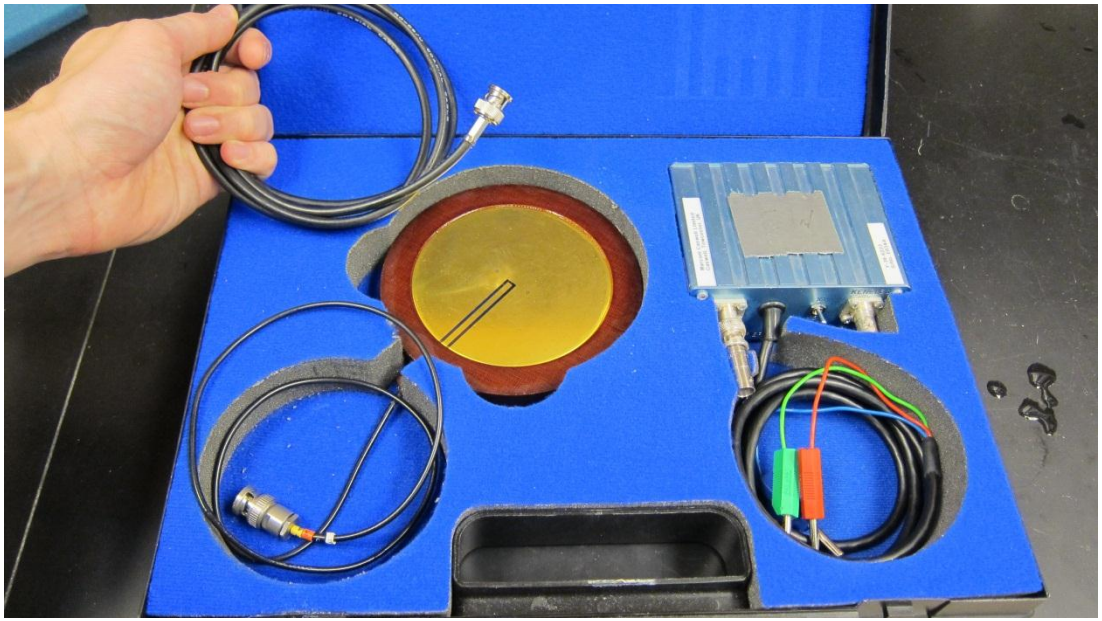
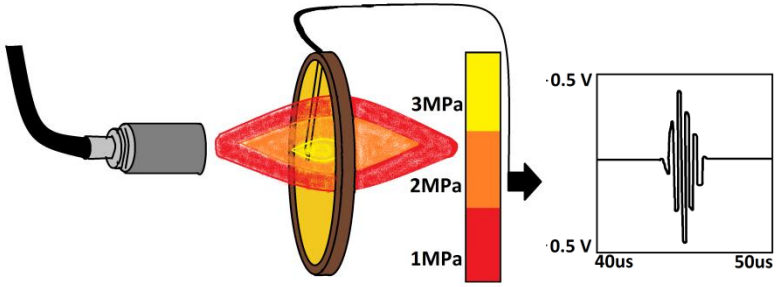
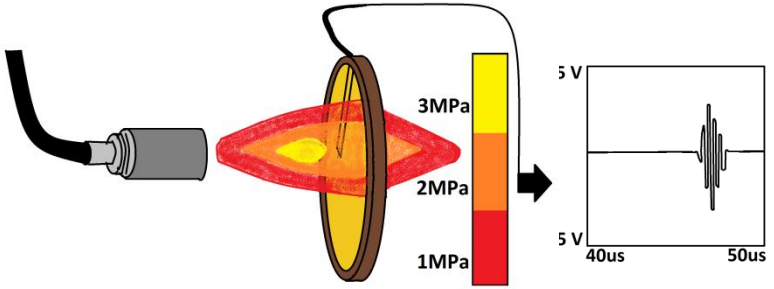


1 : Hydrophone Overview

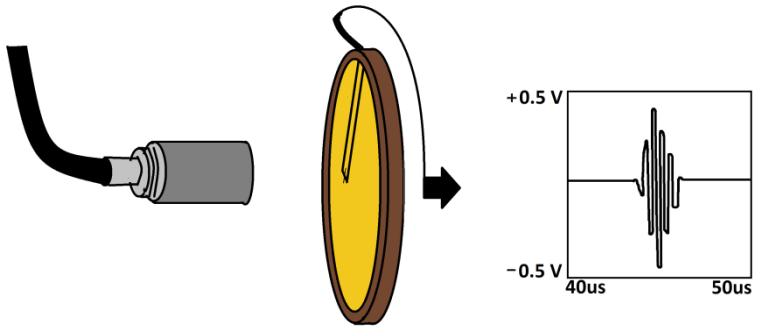
A hydrophone is a receiving device that detects ultrasound waves in water and convert them into electrical signals. There are the two Marconi PDVF hydrophones, M1 & M3, that are frequently used in the BRL.

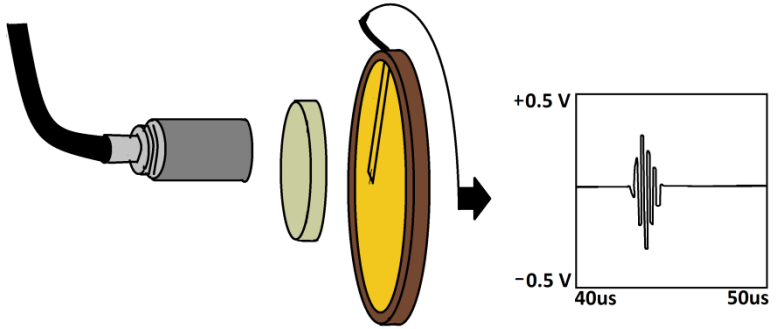
The hydrophone is used to calibrate ultrasound devices.
Depending on the location and strength of the acoustic field of an ultrasound source, the hydrophone's received electrical signals will vary in Voltage amplitude. This Voltage can be converted into a pressure to determine the spatial acoustic pressure of a source.





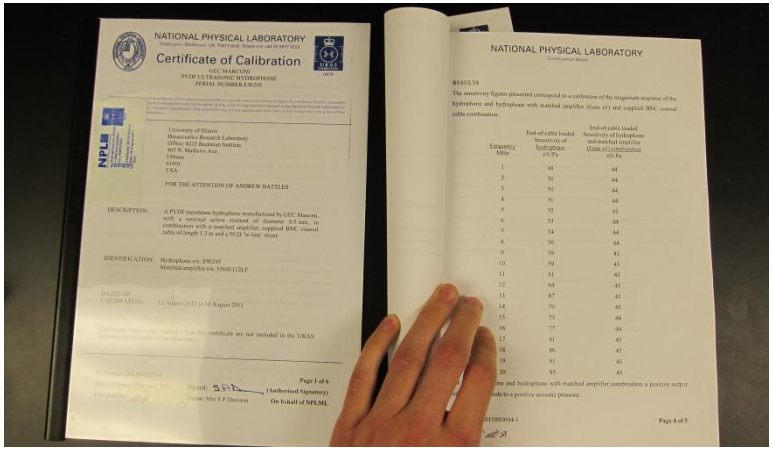
The hydrophone is used as the receiver for transducers in thru-transmission mode to measure material insertion-loss, attenuation, and speed of sound.
Information can be extracted from the signals recorded when different materials of a known thickness are placed between an ultrasound transmitter and the hydrophone receiver.



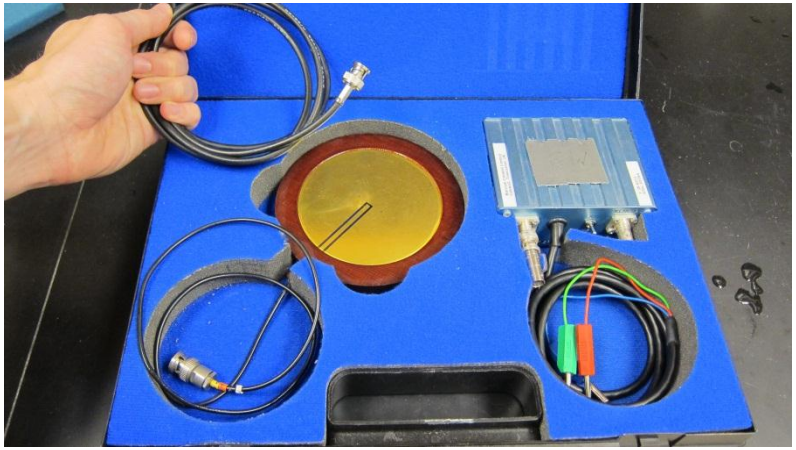


2 : Hydrophone Location & Components

The two Marconi hydrophones are located in the Daedal room. They are in the bottom drawers next to the green double doors. The drawers are labeled M1 & M3 Marconi Hydrophone. Each drawer contains the proper hydrophone stored in a protective case and a calibration document.



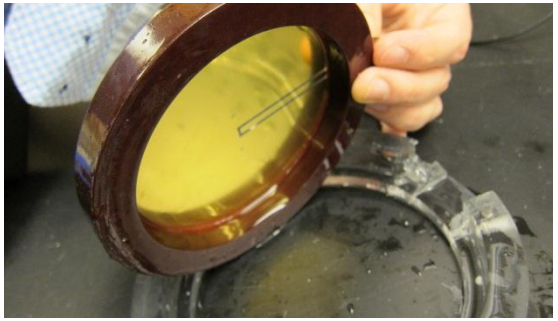
The calibration document provides the conversion factor from Voltage to Pressure in Pascal. The hydrophone has linear sensitivity from 1-60MHz. However, by using the matched preamplifier the hydrophone has a flat frequency response from 1-20 MHz (~ 0.44 nV/Pa).



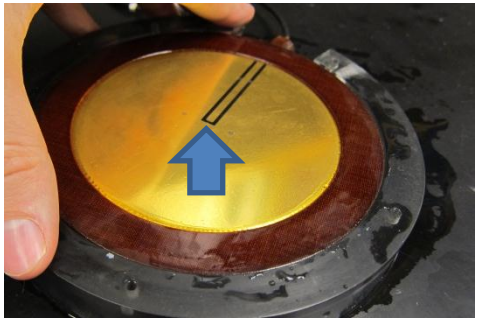
Each hydrophone is stored in a protective case; it comes with a matched pre-amplifier and cable that must always be used between the pre-amp output and monitoring scope input.

3 : Hydrophone Holder

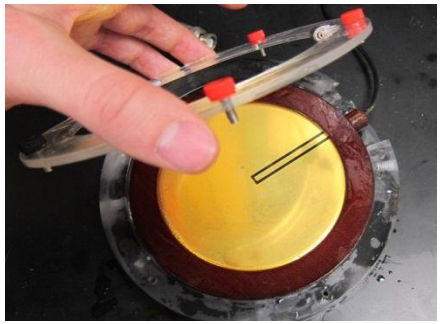
The hydrophone holders are located on the accessory table in the daedal room. There are two hydrophone holders that can fit the Marconi hydrophones. Remove the holder ring piece with the thumbscrews. Remove the hydrophone from the case by only touching the wooden edges.



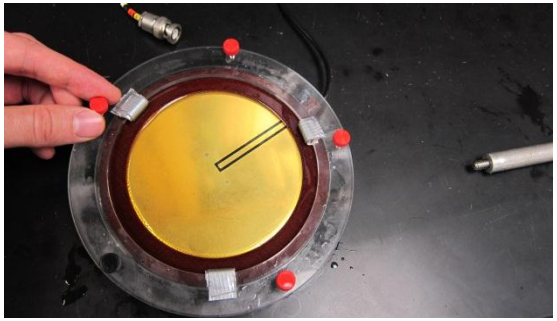
Place the concave part of the hydrophone face down in the thick holder piece. The hydrophone is very fragile and must be handled with extreme care. Do not touch or wipe the face of the hydrophone (let air dry).



The flat side of the hydrophone must sit face up in the holder. The hydrophone is directional. The Hydrophone's active element is calibrated to this face direction. The transmitting source must be in placed in front of this face.

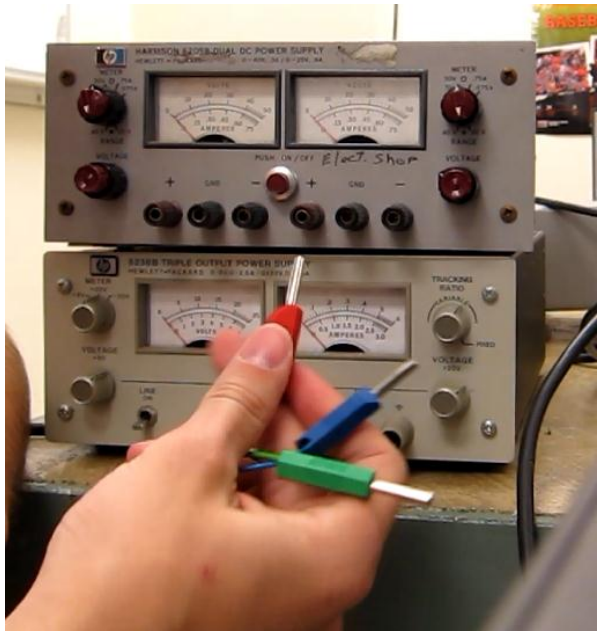


Place the thinner ring holder piece over the thicker holder piece to sandwich the hydrophone.



Secure the hydrophone in the holder by tightening the thumb screws finger tight. Screw in a rod (at least 24" inches) in the right threaded hole on the edge of the holder.

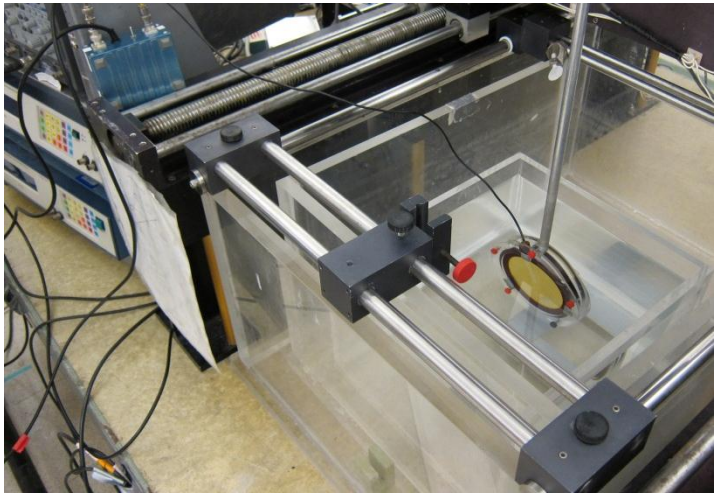
4 : Hydrophone Pre-Amplifier



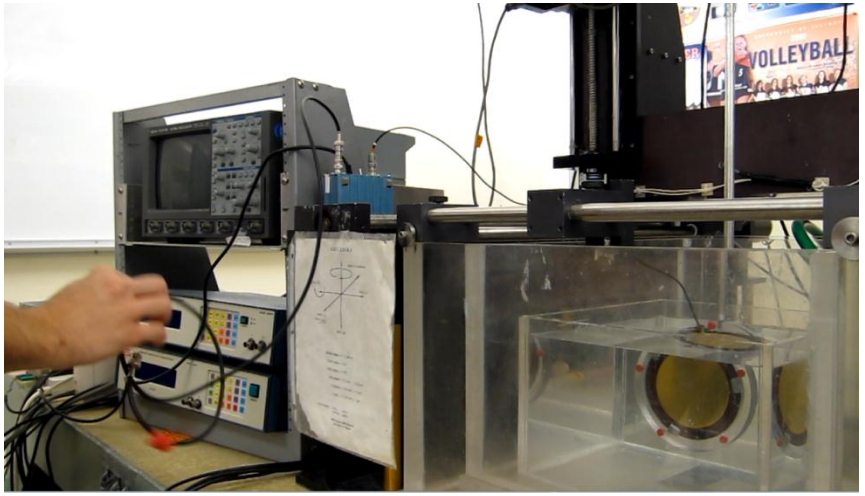
The matched pre-amplifier is used with the hydrophone when performing calibrations. Its multi-colored plugs must be connected to a power supply. There are two power supplies located next to Daedal 2 on the table behind the computer. Either one can be used; however, the bottom power supply is preferred. The proper color plug to port connections are stated on the pre-amp.

Simply plug the red plug into the +20 v port, the blue plug into the -20 V port, and the green plug into the GND port.
Turn on the Power Supply if the hydrophone is not attached or after the hydrophone has been placed in the water.
Adjust the Voltage knob so that the power supply is at 15V.
Set the amplifier gain to X1. Switching to X5 gain will amplify the original signal by a factor of 5.

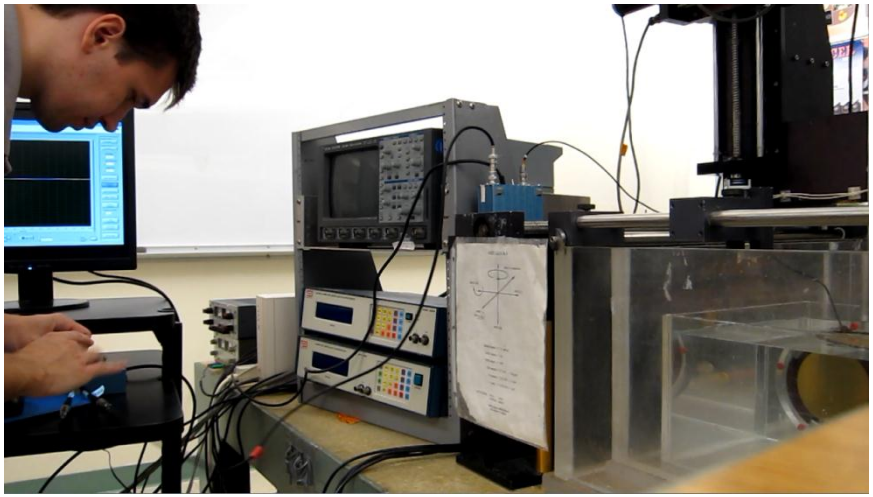
5 : Hydrophone Daedal and Cable Connections



Put the hydrophone in degassed water; all of the gold membrane must be submerged. Once it is completely submerged connect the cord from the hydrophone to the input of the pre-amp.



Use the cable which came in the hydrophone case to connect the output of pre-amp to the input channel of a monitoring device.



Use the trigger out from the transmitting source as the trigger sync for the hydrophone's received input signals.