

Aquarian Audio Products

H2a Hydrophone User's Guide

Thank you for purchasing your *Aquarian Audio Products* H2a hydrophone. This hydrophone is designed to provide high-quality audio performance in a low-cost device. It is very durable and will interface directly with ECM-type consumer microphone preamps. It offers very good sensitivity and low noise in the human auditory range. The H2a's streamlined shape and high specific gravity will help to maintain a low working depth in a moving water column. Its compact size and the easy hand of its cable make it very portable and simple to use.

Using the H2a

The H2a offers a very simple solution to your underwater listening needs. It incorporates a matched sensor and FET buffer preamplifier assembly that produces an output electrically equivalent to electret-condenser microphones. This style of microphone is the most common type used with consumer electronics, making the H2a an extremely versatile hydrophone with many options for compatible equipment.

Examples of equipment with which the H2a can be used include: minidisc, tape and digital recorders, camcorders, computers, wireless lavalier microphone transmitters, and many telephone and two-way radio transmitters. Any device with a 3.5mm (mini) microphone jack is very likely to be compatible with the H2a. Many audio devices with 2.5mm microphone or headset jacks can also be used with the H2a with the appropriate adapter. Professional microphone preamplifiers with phantom-powered XLR or TRS inputs can be used as well with the correct adapter. Check with Aquarian Audio Products for more detail.

The H2a requires bias power from the device with which it is used. **It is very unlikely that you can harm the hydrophone or the device to which you are connecting it by simply plugging it in and trying it.** If it is working, you will easily hear handling noise and can cup your hands over the hydrophone and speak into it, or use it as a contact microphone to test compatibility. If it seems to be working well, enjoy! If it does not appear to work correctly, check the documentation for the device used with the H2a and look to ensure that it does supply bias power. This is often referred to as *plug-in* or *plug-and-play* power. It may be absent or need to be switched on. If, for instance you are using a video camera that requires a battery in its normal microphone, it is likely that bias power is not available from that device. Conversely, if you can plug a microphone in that does not need its own battery, and that microphone works correctly, your H2a should work equally well. Also check for gain adjustments and increase gain if needed.

The output of your H2a is dual mono—both the left and right stereo channels are from the same source. This configuration is quite versatile because the hydrophone will drive both channels of a stereo device, such as a minidisc recorder. The ring connection of the H2a's output plug is not used when connected to a monaural device, such as a radio transmitter, but the hydrophone should work equally well. It is possible for some mono input jacks to short the output of the H2a. This will not damage the H2a nor the audio device to which it is connected, but a *mono-plug-to-stereo-jack* adapter will be required. You can record in true stereo by using a *stereo-plug-to-dual-mono-jacks* adapter and a second H2a. These adapters can be ordered through *Aquarian Audio Products* or can often be found at your local electronics store. If your audio device is not working correctly and you have checked for bias power and gain as described above, check the pin connections on the device's microphone input. The tip and/or ring connectors should be hot; the sleeve connector is ground. The ring connector should not be used as ground. (Looking at the H2a output plug, the *tip* is the end conductor; the *ring* is the middle; the *sleeve* is towards the cable)

Hydrophone care

No special care is required for the H2a. It is designed to withstand corrosion and the impact of accidental drops, but making an attempt to keep the output plug clean and dry and avoiding unnecessarily

rough handling will help to ensure the long-term stability of the product. It is best not to store the hydrophone in a waterproof enclosure. Doing so will trap moisture, salts and minerals that are left on the hydrophone and cable after deployment and increase corrosion problems with the output plug. Making an extra effort to coil the cable nicely when retrieving the hydrophone will help avoid problems with tangles as the cable ages. Most importantly, protect the cable from cuts and abrasions! The cable chosen for this application was designed to be compact and easy to use. This unfortunately comes at the expense of ultimate durability. Kinking the cable, walking on it, or dragging it over a sharp or abrasive surface may damage the cable sheath and eventually cause the hydrophone to fail. Both aquatic and terrestrial animals may attack the cable in an unattended application. Using some kind of cable shroud, such as plastic tubing, can help protect the hydrophone with long-term installations.

Specifications

The H2a is intended to be a lower-cost and easy-to-use alternative to military and lab-grade hydrophones. Deriving high sensitivity and low noise from lower-cost components were made a priority over maintaining strict tolerances. The following specifications are typical of a limited sample group and are not guaranteed. They are for basic comparison information only.

Specifications are dependent upon the audio device to which the H2a is connected. The hydrophone sensor is capable of picking up sounds from below 20Hz to over 100KHz. The output impedance of the H2a is set in part by the bias current supplied by your audio device. Hi-frequency performance is also limited by the output impedance of the hydrophone and the cable impedance—which is a function of length. Please also note that further limitations in your overall system may result from the sampling rate of digital recorders and by the input stage of your audio device's microphone preamp. Despite the uncertainties of above, you should expect to easily capture the entire human auditory range of 20Hz to 20KHz.

Sensitivity:	-180dB re: 1V/ μ Pa	(+/- 4dB 20Hz-4KHz)
Useful range:	<10 Hz to >100KHz	(not measured above 100KHz, approximate sensitivity @100KHz = -220dB re: 1V/ μ Pa)
Polar Response:	Omnidirectional	(horizontal)
Operating depth:	<80 meters	
Output impedance:	2 K Ω	(typical)
Power:	0.3 mA	(typical)
<u>Physical:</u>		(cable and output plug excluded)
Dimensions:	25mm x 46mm	
Mass:	105 grams	
Specific Gravity:	5.3	