Aquarian Audio

H2dX Hydrophone User's Guide

The H2dX hydrophone is designed to offer great sensitivity and low self noise in the human auditory range while being rugged, compact and affordable. Its small, streamlined shape and high specific gravity will help maintain a low working depth in mild wind and currents. Its compact size and flexible cable make it very portable and simple to use. It can be used with any microphone preamp with mating connector and phantom power. In most cases, these preamps will be built into a digital recorder, mixer, professional video camera or PA system.

Using the H2dX

The H2dX is terminated with a 3-pin male XLR plug. Wiring is standard: pin 1 is ground, pin 2 is hot and pin 3 unused[1]. This configuration should be compatible with any standard female XLR microphone jack. **Phantom power is required and will need to be switched on in your device.** Any standard phantom power supply voltage will work. Do not exceed +48V when powering the H2dX. If your recorder or mic preamp offers options for phantom voltage, we recommend using the lowest voltage available for lowest noise and power consumption. With the connection firmly made and phantom power switched on, there's nothing more to do but adjust levels and take in the sounds of the deep.

Hydrophone care

No special care is required for the H2dX. It is designed to withstand corrosion from seawater and the impact of accidental drops[2]. Try to keep the output plug clean and dry and avoid unnecessarily rough handling 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 prematurely corrode the output plug. Making an extra effort to coil the cable neatly when retrieving the hydrophone will help avoid problems with tangles as the cable ages. Most importantly, protect the cable from cuts and abrasions! The H2dM uses a custom-made cable with a very durable PU jacket. However, it is also designed to be compact and flexible. 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 conduit, such as plastic tubing, can help protect the hydrophone in long-term installations.

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1 Most XLR-terminated microphones are balanced and use Pin 3 for a *cold* (or *low*) side of the signal, which has the same output impedance and is typically complimentary to the signal on Pin 2. This configuration can be beneficial for common-mode noise reduction when used with a balanced input device. The H2dX runs single-ended. It is a simple output plug variation of our standard H2dM. Single-ended operation lowers cost (mostly because it allows the use of a coaxial cable) and power use. Common-mode noise is seldom a problem in most hydrophone applications and the hydrophone is well shielded from electrical noise. Nearly all microphone preamps now are electronically balanced and tolerate this well, so this single-ended configuration is generally advantageous overall.

2 The H2dM uses a plate sensor on the end opposite the cable—somewhat like a microphone diaphragm. It is extremely crush-resistant with radial loads, but may be damaged if dropped on its end. It is quite tough for what it is, but note that it is a sensitive instrument. Avoid throwing it into the water, or any other activity that may result with an impact to the hydrophone. One great advantage of this design is that it is easy to repair if necessary. Contact Aquarian for support.

Specifications

Specifications are dependent upon the audio device to which the H2dX is connected. The output impedance of the H2dX is set by the phantom power supply from the audio device with which the hydrophone is used. Gain of the signal conditioning amplifier in the H2dX is related to the bias current and input impedance of the mic preamp. High-frequency performance is also limited by the output impedance of the hydrophone and the cable impedance—which is a function of length. For all of these reasons, we do not publish detailed response plots for this design. 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.

The following specifications are based on typical response when using the H2dX with a standard 48V phantom power supply (48V with 6.8K pull-up resistors):

Sensitivity:	-165dB re: 1V/μPa	(+/- 4dB 20Hz-4KHz)
Useful range:	<10 Hz to >100KHz	(not measured above 100KHz, approximate sensitivity @100KHz = -210dB re: 1V/μPa)
Polar Response:	Omnidirectional	(horizontal)
Operating depth:	<80 meters	
Output impedance:	6.8 KΩ	(typical)
Power:	1.2 mA	(typical)
Physical:		(cable and output plug excluded)
Dimensions:	25mm x 46mm	
Mass:	105 grams	
Specific Gravity:	5.3	