



Lubell Labs LL1424HP Underwater Acoustic Transducer

The Lubell Labs LL1424HP is a high-power piezoelectric Underwater Acoustic Transducer (UAT) designed for use in Underwater Acoustic Deterrent Systems (uADS), Diver Deterrent Systems (DDS), Acoustic Sub-Bottom Profiling (SBP) systems, and general military and scientific applications. The LL-1424HP may also be used as an underwater speaker when high power is required.

The Lubell Labs LL1424HP has a useful frequency range of 200Hz - 9kHz, a maximum SPL of 197dB/uPa/m @ 600Hz, and a nominal impedance of 4 ohms (varies with frequency - see [Z](#) plot or tabular [data](#)). The LL-1424HP is intended for use in rivers and lakes by virtue of its rugged epoxy finish and 316 stainless steel cage mounting system.

The Lubell Labs LL1424HP is fitted with a Subconn underwater mateable bulkhead connector, and includes a mating 50 foot 16/3 Subconn SOOW cable fitted with Speakon conductor. Custom SOOW cable assemblies of varying lengths and gauges may be special ordered -- please allow 8 - 12 week lead time for delivery.

Included with the Lubell LL1424HP is a Lubell Labs AC1424HP transformer box, which connects between the LL1424HP transducer and a Crown CDi2000 (or equivalent) Class AB amplifier. The AC1424HP transformer box is a key element in the overall system design, providing tuned RCL circuitry for proper impedance and response of the connected LL1424HP transducer, as well as electrical isolation of the metal-bodied LL1424HP transducer housing from bridged (BTL) amplifiers floating output. The AC1424HP transformer box connections (3 screw terminal input and Speakon output) include an earth ground pass-thru, allowing the metal-bodied LL1424HP transducer body to be grounded to the facilities approved earth / water ground via the AC1424HP transformer boxes GROUND terminal.

Lubell Labs recommends the Crown CDi2000 amplifier, which uses Class AB topology to remain stable when driving reactive loads such as the Lubell Labs LL1424HP. Here are three possible connection schemes:

1. **SINGLE SPEAKER, SINGLE AMP:** LL1424HP connected to AC1424HP connected to channel 1 only (no connection on channel 2; Set amp to DUAL MONO mode). In this scenario, amplifier is rated at 800 watts @ 4 ohms (56.6 Vrms) and 475 watts @ 8 ohms (61.64 Vrms). Please refer to the LL1424HP's [tabular data](#) for your frequency band of interest, observing impedance (Z) and [SPL](#), keeping in mind that only 1 Vrms (TVR value) applied to the AC1424HP/LL1424HP will result in sound levels of 158dB/uPa/m! Please also remember maximum rating of AC1424HP/LL1424HP is 80 Vrms or 10A, **whichever comes first**.
2. **SINGLE SPEAKER, SINGLE AMP (HIGH POWER):** LL1424HP connected to AC1424HP connected to BRIDGED terminals (set amp to BRIDGED mode). In this scenario, amplifier is rated at 2000 watts @ 4 ohms (89.44 Vrms) and 1600 watts @ 8 ohms (113.14 Vrms). Please refer to the LL1424HP's [tabular data](#) for your frequency band of interest, observing impedance (Z) and [SPL](#), keeping in mind that only 1 Vrms (TVR value) applied to the AC1424HP/LL1424HP will result in sound levels of 158dB/uPa/m! Please also remember maximum rating of AC1424HP/LL1424HP is 80 Vrms or 10A, **whichever comes first..**
3. **TWO SPEAKERS, SINGLE AMP:** First LL1424HP connected to first AC1424HP connected to channel 1; Second LL1424HP connected to second AC1424HP connected to channel 2 (set amp to DUAL MONO mode). In this scenario, amplifier is rated at 800 watts @ 4 ohms (56.6 Vrms) and 475 watts @ 8 ohms (61.64 Vrms) per channel. Please refer to the LL1424HP's [tabular data](#) for your frequency band of interest, observing impedance (Z) and [SPL](#), keeping in mind that only 1 Vrms (TVR value) applied to the AC1424HP/LL1424HP will result in sound levels of 158dB/uPa/m! Please also remember maximum rating of AC1424HP/LL1424HP is 80 Vrms or 10A, **whichever comes first**.

We can easily determine the SPL of the LL1424HP at a given frequency and drive voltage. For example (referring to the LL1424HP TVR column in the [tabular data](#)), we see that at 600 Hz, the output of the LL1424HP is 158.07dB/uPa/volt. To derive SPL, calculate the voltage gain and add to TVR value. Voltage gain (dB) = $20 \times \log(\text{ending voltage} / \text{beginning voltage})$. For 80 Vrms drive, we [calculate](#) a gain of 38.06dB which is added to the 158.07dB TVR value resulting in an SPL of 196dB/uPa/m.

Our maximum voltage and current rating for the AC1424HP / LL1424HP across the frequency band of 200Hz - 9000Hz is **80 Vrms or 10 Amperes, whichever comes first**. Monitoring the amplifier's drive voltage (with a True RMS DVOM) and current (with ampmeter) is of **utmost importance** when setting up and monitoring the system. Our [tabular data](#) (from NUWC-Dodge Pond) may be referred to as well, but values will vary from published values depending on the environment that the LL1424HP is used in.

- **PRICE:** USD \$10,203
- **Frequency Range:** 200Hz - 9kHz
- **Maximum SPL:** 196dB/uPa/m @ 600Hz
- **Maximum Voltage/Current:** 80 Vrms or 10A, **whichever comes first!**
- **Duty Cycle:** 100%/10A, 50%/14A

- **Impedance:** 4 ohms nominal (including AC1424HP xfmr box)
- **Depth Rating:** 6' - 40'
- **Bulkhead Connector:** Subconn [MCBH3MSS](#). Coding: Pin 1 black (return), Pin 2 white (hot), Pin 3 green (ground)
- **Cable:** Subconn [MCIL3F/MCDLS-F](#) on 50 foot SOOW terminated with Speakon [NL4FX](#) Pin 1- black (return), Pin 1+ white (hot), Pin 2- green (ground).
- **Dimensions:** 16.5 IN x 16.5 IN x 16.5 IN
- **Ducer/Cage Wt:** 61 lbs/air, 33 lbs/water
- **Finish:** 10-mil PPG Amerlock II (Safety Yellow) over MIL-C-5541 Class 1-A; 316 SS cage (natural electropolished)
- **Documents:** [Guide](#), [Brochure](#), [TVR](#), [SPL](#), [Z](#), [tabular](#)
- **Included:** Protective cage, [AC1424HP](#) bridging xfmr box, 50 foot terminated cable
- **Options:** Add Swagelok SS-400-1-OR pressure fitting (\$120). Custom length/gauge SOOW cable assemblies (Market Price).
- **Warranty:** 2 year limited
- **Amplifier:** [CDi2000](#) (USA) \$1870.14

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