



## Lubell LL964C Underwater Acoustic Transducer (UAT) Instructions

1. The Lubell LL964C (cage-mount) and LL916H (harness-mount) are high-performance piezoelectric underwater acoustic transducers developed, patented, and manufactured by Lubell Labs, Inc. of Columbus Ohio. The LL964C/H is designed for operation in the 200 Hz to 23 kHz frequency range, and provides output levels up to 180dB/uPa/m @ 1 kHz when driven with full 40 Vrms drive. (The LL964C/H is the high-impedance version of the popular 20 Vrms Lubell LL916C/H, allowing very long cable runs with minimal insertion loss.) The LL964C/H may be used in tank, river, and ocean at depth range of 1.83 m – 15.24 m.
2. The LL964C/H is rated at 40 Vrms maximum voltage and 1.5 amps maximum current (*whichever comes first*) between the frequency range of 200 Hz to 23 kHz. Please monitor these values with proper instrumentation to ensure that they are not exceeded.
3. The LL964C/H requires 32 ohms of total external resistance, which can be a combination of cable round-trip resistance plus resistance from a series 50-watt resistor of the correct value inserted in each white speaker lead.
4. To help protect the LL964C/H speaker and the amplifier, a Bussman AGC-1.5-R fuse placed in a Bussman BK/HFB-R fuse holder may be inserted in each speaker's white signal lead.
5. The Crown XLi 800 is recommended for powering up to four LL964C/H underwater acoustic transducers per channel. This amplifier has a class AB output stage, which works well with a reactive UAT such as the Lubell LL964C/H. The amplifier is also UL listed, and rated for Class 2 wiring. For safety, please power the amplifier from a grounded GFCI protected outlet.
6. The TVR on following page indicates output level of the LL964C/H with 1 Vrms applied.
7. A rope or boom must be attached to the LL964C/H for raising and lowering the unit from the water. Do not tow the unit, unless incorporated into a hydrodynamic body such as a tow fish. Use at minimum depth of 1.83 m, and a maximum depth of 15.24 m.
8. The LL964C can be special ordered with an underwater pluggable bulkhead connector (Subconn MCBH3MSS) and mating cable (Subconn MCIL3F-18-50 or MCIL3F-16-100). Follow proper lubrication and wet-mating procedures called out by MacArtney / Subconn.
9. Please keep divers a minimum distance of 1.83 meters from an operating speaker, and vacate the water during inclement weather and lightning storms.
10. Inspect cables before each use, and return to Lubell Labs for replacement in the event of damage.

