INTEGRATED ULTRASOUND MOBILE PLAYER

LunaLure UMP-2

User Manual

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CONTENT

NOTE: Animal Sound Labs reserves the right to make modifications to the parameters and operation without prior notice. Due to the continuous improvement and enhancement process, some of the functions listed in this manual may vary slightly depending on the version of the firmware.

This edition is for firmware v1.0

1. Introduction

Thank you for purchasing our device!
LunaLure UMP-2 is the successor and expanded version of the first national **Luna Lure UMP-1** integrated Mobile Ultrasound Player. **Luna Lure UMP-2** combines:

- Ultrasonic or audio file player for two-(or one-)channel WAV-PCM, FLAC, APE and MP3 files stored on SD/SDHC/SDXC memory cards;
- ultrasonic power amplifier (frequency-corrected to the loudspeaker characteristics);
- 32-point discrete signal level regulator (2 buttons);
- Five-point control display with additional control signaling the amplifier overdrive/clipping (6th red LED);
- Built-in ultrasonic speaker, internally wired with very short wires to minimize power losses.
- internal (8 AA cells, primary or rechargeable batteries) or external powering (9-15V via PWR connector);

The device is a complete and independent source of sounds or ultrasounds that can be used, for example, to attract bats, birds, testing an ultrasonic detectors, training or other purposes related to the reproduction of sounds or ultrasounds.

1.1. Working with external active speaker

The **LunaLure UMP-2** ultrasound player can work with one (or more) mobile ultrasound active speakers (**Luna Speaker UMS-1)** or another device (such as another **Luna Lure UMP-1** or **UMP-2** device) to increase the width of the radiated (ultra)sound beam, or to increase the volume in the selected direction.
The active ultrasonic loudspeaker can be connected by a special signal cable supplied with the external speaker through a 3-pin **LINE OUT** connector.
(pin 1: **GND**; pin 2: **signal output**, pin 3: **signal input**)
The level of the output signal is independent of the power level controller setting of the built-in amplifier.
The **Luna Lure UMP-2** is a two-channel device, the internal speaker reproduces the signal from the right channel, the left channel is connected to the **LINE OUT** connector**.**
If you want to play the same signal on all devices, use mono files or dual-channel files with the same signal on both channels.

2. Preparing for work

2.1. Powering the device

The device can be powered in two ways:
- from a pack of 8 AA size batteries (or accumulators) placed in a plastic basket with a battery connector;
- from an external source (battery, AC adapter, cigarette lighter socket) via an external power outlet and the corresponding cable available in the accessory kit or sold separately.

The current supply voltage range is about 9-15V, but due to the built-in converter the current consumption increases as the supply voltage drops. This applies both to internal and external power supply.
Switching power from external to internal occurs automatically when the external voltage is disconnected or when the external voltage drops below the internal supply voltage.
Device is protected against improper polarity of supply voltage. Incorrect polarity of the supply voltage will not damage the unit, but the unit will not start up until it is properly connected.
To connect an external power supply unscrew the blue protective cap that covers the external power connector on the right / control panel (connector marked as PWR). Then connect the power supply cable (AC adapter or other dedicated power cable) to the PWR socket. The power cord plug (and the other cables) can only fit in one position. The white dots on the connectors should be pointing towards the top of the device. The power plug fits only into the external power socket, as is with the LINE IN / LINE OUT and the USB connector.
When internal and/or external power is connected - press the ⏻ button briefly to power on the device. After powering up the LEDBAR will show the battery voltage level for ~3 sec, so you can quickly determine the state of battery. If the LEDBAR shows only 1 LED (or none) - the batteries needs to be replaced.

2.2. Battery replacement.
1) Unscrew 2 screws securing the battery compartment door.
2) Use the handle (cord with knot) to slide out the battery cartridge.
3) Place 8 pieces of AA size cells (primary or rechargeable batteries) in the cartridge and keep the polarity as marked inside each basket of battery cartridge (you can easily disconnect the battery cartridge from the device by pulling the plastic connector casing on the back of the cartridge).
4) Carefully place the cartridge back inside the battery compartment, keeping in mind that the battery basket connector should be closer to the speaker/front wall and that the power cords are not cut between the cartridge and the side walls of the battery compartment.
5) Hide the handle (cord with knot) inside the battery compartment opening.
6) Screw 2 screws fixing the battery compartment door.

NOTE: If the device is to be left unused for a long time - it is recommended to remove the battery from the battery compartment. This will prevent possible spillage or corrosion of the battery contacts and, in the case of accumulators, from being over-discharged due to the minimal (but still existing) current that powers the device even during shutdown ("sleep" mode) with minimized current consumption (the order of single microamps).

2.3. Memory card and files for playback
The **LunaLure UMP-2** player plays **WAV-PCM, FLAC and APE** files

with the following parameters:
- number of channels: **1 (mono)** or **2 (stereo)**
- resolution: **16, 24** or **32 bits**
- sampling frequency: **44.1, 48, 88.2, 96, 176.4, 192, 352.8** or **384 kHz.**

MP3 files can be only **16-bit, mono** or **stereo, 44.1**or **48 kHz.**

To prepare a memory card for playback (a computer is needed) - place the SD (SDHC/SDXC) memory card in your computer and navigate to its location. Then Copy-paste or drag-drop the files you want to play to the top-directory of the card. Remove the card (safe remove) from computer and place it in the **LunaLure** device.
It is preferred to format your memory card before using it: this will make sure you will not experience any playback difficulties. Use a FAT16 or FAT32 file system.
• On Mac: Open the “Disk Utility” application and select your SD card. Select “Erase” from the menu, then choose “FAT”.
• On Windows: Open “My Computer”, rightclick on your memory card. Select “Format” from the menu, then choose “FAT” and press start.

NOTE: For the current firmware version, if there are files with other sampling frequencies (other than above mentioned) on the memory card, they will not be played. Therefore, it is recommended that their prior conversion (so-called "upsampling") in the editor or conversion program to the nearest higher frequency of the above mentioned. You can also downsample the file to a lower frequency, but note that the maximum reproducible frequency is at most half the sampling frequency (so called Nyquist frequency). The Time Expanded recordings can also be reproduced after restoring the original speed by adjusting the sample rate of the files to a value corresponding to the sampling frequency when writing to memory in the detector, and if necessary - performing upsampling or downsampling to one of the compatible frequency. For maximizing the output power, it is also advisable to maximize the signal level in the recording, this function is called "normalization". For simulating the moving sound source you can perform "volume envelope" editing.
*You can use almost any audio editor to edit wav files eg. **Audacity**, or utility program: **Sound eXchange** (links to programs are in the "Download" section on the **www.LunaBat.com** site).*
*SD, SDHC or SDXC memory cards with FAT16 or FAT32 file systems are acceptable. SDXC memory cards must be formatted for FAT32 before use, eg using the "SD Format" program - link to the program under "Download" section on the **www.LunaBat.com** site).*

2.4. Mounting
The **Luna Lure UMP-2** can be mounted on a photo tripod with a "small /

amateur photo thread" (1/4" UNC - 20 tpi thread) by screwing the head or tripod adapter to a tripod socket located on the bottom wall of the enclosure or hanging it with the steel eyelet mount on the top wall of the housing.

3. Working with the player

3.1. Starting playback

Before playing, unscrew two screws securing the battery compartment door and insert a memory card with wav (ape, flac or mp3) files into the memory card slot. Memory card gold contacts should be pointing towards the battery compartment. The wav files are played in a loop in alphabetical order from the root directory and subdirectories of the card (let's call it: "global loop"). If you need to loop a single file ("local loop"), press the (**REPEAT**) button below the power switch during the playback of this file. The "**MODE**" LED will change the color from yellow to white. Press the **REPEAT** button again to end the "local loop" mode. The "**MODE**" LED will change the color from white to yellow. When switched to "global loop" the player will play all compatible files in sequence from the card in an infinite loop until stopped by pressing the blue **PLAY/PAUSE** button marked with **>||** symbol.
When power is turned on with the ⏻ button, the player starts up in standby mode. This is signaled by the "**MODE**" LED which will light up in white color and the red LED marked with **> / ||** symbol**.** To start playback briefly press the **> ||** button. The red LED (**> / ||**) should start flashing.
Playback can be paused at any time by briefly pressing **>||** button. Playback can be resumed by briefly pressing the **>||** button again.

3.2. Volume regulation

You can adjust the playback volume using the **VOL -/+** buttons in 32 steps. The last **CLIP / NoSD** LED lights up **red** indicating that the amplifier is overdriven and that nonlinear distortions may increase. Then reduce the volume of the playback signal with the volume control (**VOL -**) button until the overdrive disappears. If for some reason the playback volume has dropped below the maximum level and cannot be adjusted to desired volume level - you can reset (maximize) the volume with a sharp thin object (needle, clip, wire etc) - press and hold approx. 10-15 sec a microswitch located behind a small round hole on the left connector panel under **LINE IN / LINE OUT** socket. During this volume resetting process the device should be in standby mode or in playback mode.

3.3. Reading the battery status

After powering up the device the volume led's will light up for ca. 3 seconds according to the current voltage of the batteries. There is a small difference in the rechargeable and non-rechargeable batteries because of the cell voltage difference (1.2V/cell vs. 1.5V/cell) so the new/fresh non-rechargeable batteries should have higher voltage than freshly charged rechargeables.
For fully charged rechargeables ~4-5 LEDs should be visible, for fresh non-rechargeables ~5 LEDs should be visible. If there is only one diode visible after powering

up the device - there is very little power in the batteries and it's best to replace the batteries with fresh/recharged. If only 1 LED (or 2 for a start and then 1 LED) lights up - batteries are also discharged, but they are on the edge of threshold of starting up the device. There is some histeresis loop added in the battery level sensing, so the starting voltage is higher than disabling voltage. When supply voltage is higher than ~8.1V internal dc converter starts up, and when voltage drops down to ~7.1V it will shut down the dc converter to avoid some unexpected behaviour caused by voltage regeneration process in batteries. This process is hard to be fully controlled and it's best to always replace the batteries when one of the situation occurs:
- only 1 LED (or for short period 2 LEDs and then 1 LED) are lighten up at start;
- only 1 green LED (or none on the LED bar) and the red CLIP LED are lighten up;
- when the red CLIP LED is constantly on and the distortion during operation starts to be very loud and audible with the human ear (except when the input signal is too high and the amplifier is simply overdriven).

3.4. Operation as an active ultrasonic speaker

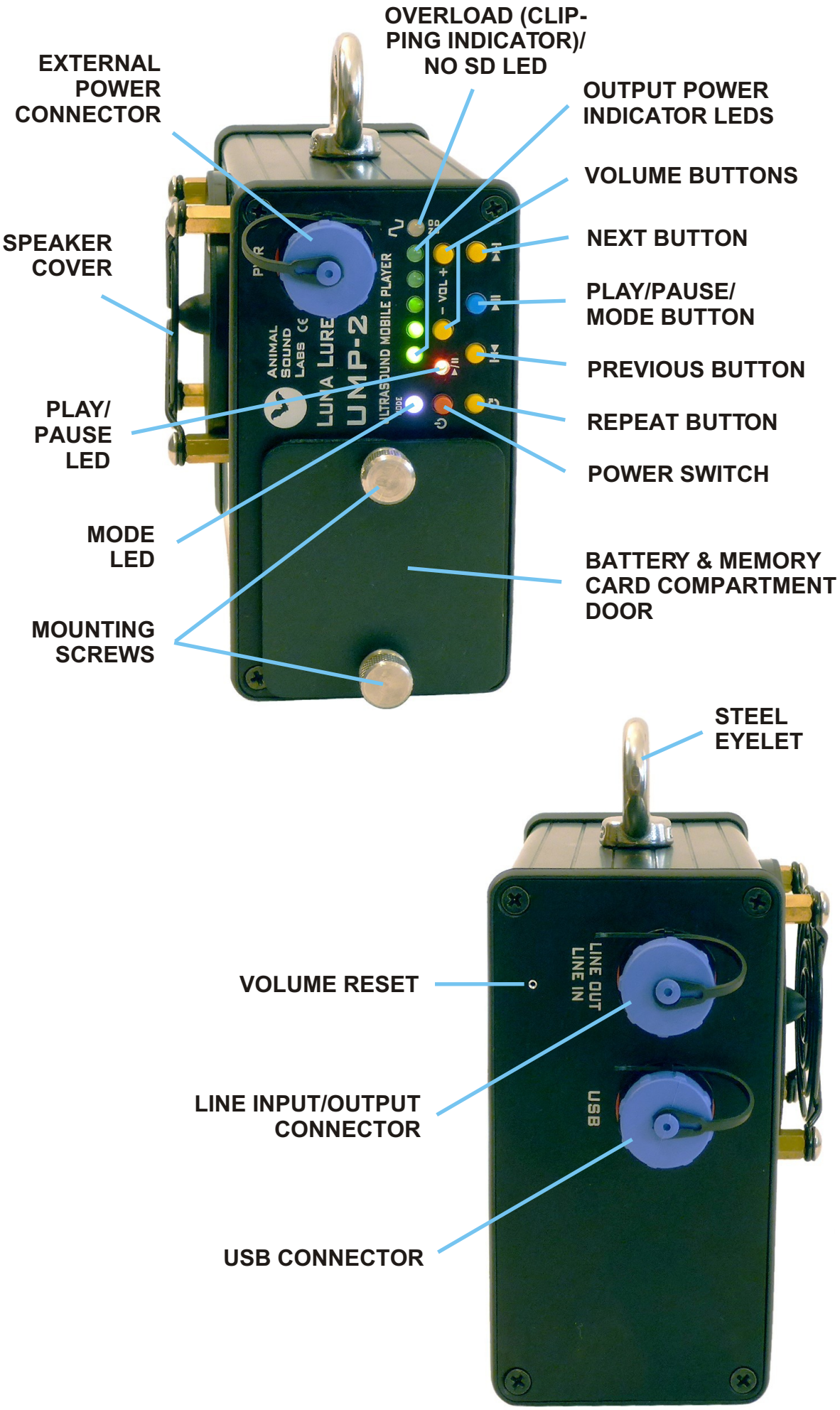
To switch the player to active ultrasound mode after turning on, hold down the **> ||** button for about 3 seconds. The red LED **>/||** will go out and the player section will be turned off, but the amplifier and the volume control will continue to work, allowing you to play sounds from an external source connected via signal cable to the **LINE IN** input connector (from a connected external player, a **USB-DAC** or **DAQ** card, or another sound or ultrasound source).
To turn on memory card playback again, turn off the power by pressing the ⏻ button and press this button again to re-enable the device in the player mode.

*NOTE: First power on the device and switch to active speaker mode and **then** enable the input signal, otherwise proper initialisation of the device may not occur.*

4. Playback from computer *(manual it's in preparation and will be available soon in the Download section at **www.lunabat.com** site)*

5. TECHNICAL SPECIFICATION

Reproduced frequency band (+/-6dB)	1 kHz - 140 kHz
File sampling frequencies	44.1,48, 88.2, 96, 176.4,192, 352.8 or 384 kHz
Digital to Analog Converter	high precision double Sigma-Delta 24bit
Signal to Noise ratio	~80 dBA (+/-2dB)
Maximal output power	12 W
Sleep current (disable state)	<10 uA
Line input level (speaker mode, digipot at -6dB /default position)	1,5 Vrms
Line output level (0dB F.S.)	1,5 Vrms
Internal power supply	8 * AA/R6 cells
External power supply	9-15V (3A min.)
Battery operating time (at 2W effective mean/avg. output power)	> 10 h
Tripod mount	female thread for std. photo tripod (1/4" UNC, 20tpi)
External dimensions (without eyelet)	155x105x67 mm
Steel eyelet diameter	28 mm
Weight (with 8 * AA cells)	~950 g


EXTERNAL POWER CONNECTOR
SPEAKER COVER
PLAY/ PAUSE LED
MODE LED
MOUNTING SCREWS
OVERLOAD (CLIP-PING INDICATOR)/ NO SD LED
OUTPUT POWER INDICATOR LEDS
VOLUME BUTTONS
NEXT BUTTON
PLAY/PAUSE/ MODE BUTTON
PREVIOUS BUTTON
REPEAT BUTTON
POWER SWITCH
BATTERY & MEMORY CARD COMPARTMENT DOOR
ANIMAL SOUND LABS
LUNA LURE
UMP-2
ULTRASOUND MOBILE PLAYER
VOL +
VOL -
STEEL EYELET
VOLUME RESET
LINE INPUT/OUTPUT CONNECTOR
USB CONNECTOR
LINE OUT
LINE IN
USB