BROADBAND ULTRASOUND 2-CHANNEL USB INTERFACE

LUNADAC-1

User Manual

ANIMAL SOUND LABS
WILDLIFE MONITORING SYSTEMS
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CONTENT

TECHNICAL SPECIFICATION

Power supply ..... 5V, via USB cable
Reproduced frequency band (+0/-3dB) ..... 0.5 Hz - 190 kHz
Reproduced frequency band (+/-0.5dB) ..... 2 Hz - 170 kHz
USB protocol ver. for highest sampling rate ..... v.2.0, v3.0 and v3.1
USB Audio standard ..... Class 2.0*
Sampling Rate Frequencies ..... 44.1, 48, 88.2, 96, 176.4, 192, 352.8, 384 kHz**
Bit-depth ..... 16, 20, 24, 32 bit
Signal to Noise ratio (24-bit, rel 0dB FS, 22 Hz-22 kHz band) ..... > 110 dB
Signal to Noise ratio (24-bit, rel 0dB FS, 1 Hz-190 kHz band) ..... > 90 dB
Inter-channel Separation ..... > 90 dB
Total Harmonic Distortions ..... < 0.008 %
Output Signal Level (0dB FS, 1 kHz) ..... 1.45 Vrms
External dimensions (without dust caps) ..... 138 x 81 x 32 mm
Weight (without USB cable) ..... ~210 g

* Class 1.0 is also available but up to 96 kHz of Sampling Rate
** Available via ASIO or WASAPI drivers

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.

version.1.0, 2018.03.29

2. Introduction

Thank you for purchasing our device!
LunaDAC-1 is designed to reproduce a very wide spectrum of signals with frequencies from very low sounds or even infrasounds (below 1 Hz) up to ~190 kHz. It is also possible to work from 0 Hz (DC) in the special version on demand. The device was created mainly to reproduce echolocation of bats or other ultrasounds (as well as audible or infrasounds) from a computer. It is the link connecting the computer with our active **Luna Speaker UMS-1** ultrasonic speakers or **Luna Lure UMP-1**, or the latest **LunaLure UMP-2** devices**.**
Thanks to the use of high resolution digital-to-analog converters with bit depth up to 32 bits and output anti-aliasing filters optimized for ultrasound reproduction, it is possible to proper convert digital recordings to analog signals available on two output connectors of the device, to which you can connect one or two external ultrasonic amplifiers or active loudspeakers or other devices.
Analog signals are sent to the receiving devices via appropriate signal cables. They can be supplied as an optional accessories or as a standard cables available with our above mentioned devices. Cables are equipped with screwed industrial waterproof connectors with gold-plated contacts. These connectors provide a secure connection in all conditions.
Connection to the computer is via classic USB „printer" cable (included with the interface) uses the latest USB Audio Class 2.0 (UAC2) standard. This specification allows to increase the maximum sampling rate of reproduced recordings up to 384 kHz (not only up to 192 kHz, as was the case in audio devices) and allows using the **ASIO** drivers at such high resolution, which ensure lossless transfer of full bandwidth with flat frequency response to approx. 190 kHz. Thanks to this, there is the possibility of direct control over the played signals from compatible audio editors and programs supporting such high sampling rates, as well as from playlists of multimedia players, eg the popular and free **Foobar** player (equipped with the **foo-asio-out** plugin). This is useful in situations where manual, interactive selection of signals for reproduction or visual control of reproduced recordings is necessary (eg during scientific researches, bat detector trainings, etc.).
The device also has built-in output signal line buffers enabling the connection of significant electrical capacities and thus enable broadband transfer even through long signal cables, without noticeable signal losses. The device is powered from the computer's USB port through the same connection cable through which the digital signal is transmitted and has also been optimized in terms of power consumption. So it is possible to work for several hours with a laptop or even a tablet in field conditions, without access to power from the power grid.
The use of high-quality modern components in surface mounting (with the exception of connectors, which was intended) ensures many years of trouble-free operation and long-term compatibility with the latest operating systems, and miniaturization and optimization of the mosaic of connection paths on digital and analog plates allowed to obtain very small external dimensions, which in combination with the simplicity of service is a breakthrough in both price and comfort of use, especially when compared to classic DAQ devices (specialized data acquisition cards with additional built-in DACs).

3. Windows driver installation

Download drivers from LunaDAC-1 descriptive site: ***http://animalsoundlabs.pl/en/luna-dac-1-en/*** (from link available in **DOWNLOAD** tab)

Once you've downloaded the drivers:

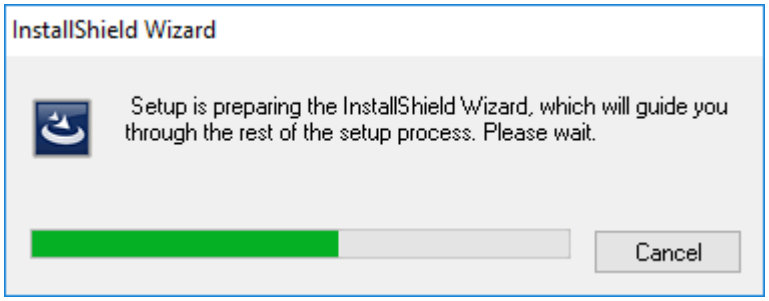
Step 1: Go to your Downloads folder (or Desktop, or wherever you had Windows put the drivers.)

Step 2:
For Windows XP/7/8/8.1/10: Double-Click on the **LunaDAC-1_XP_W7_W8_1_03.zip** file to expand it.
For Windows 10 only: Double-Click on the **LunaDAC-1_W10_1_01.zip** file to expand it.

Step 3:
For Windows XP/7/8/8.1/10: Click on the **LunaDAC-1_XP_W7_W8_1_03** folder to open it.
For Windows 10 only: **LunaDAC-1_W10_1_01.zip** folder to open it.

Step 4: Connect the LunaDAC-1 device with a standard USB A-B cable (standard accessory or other with 2m or less in length, with true USB 2.0 or higher rating).

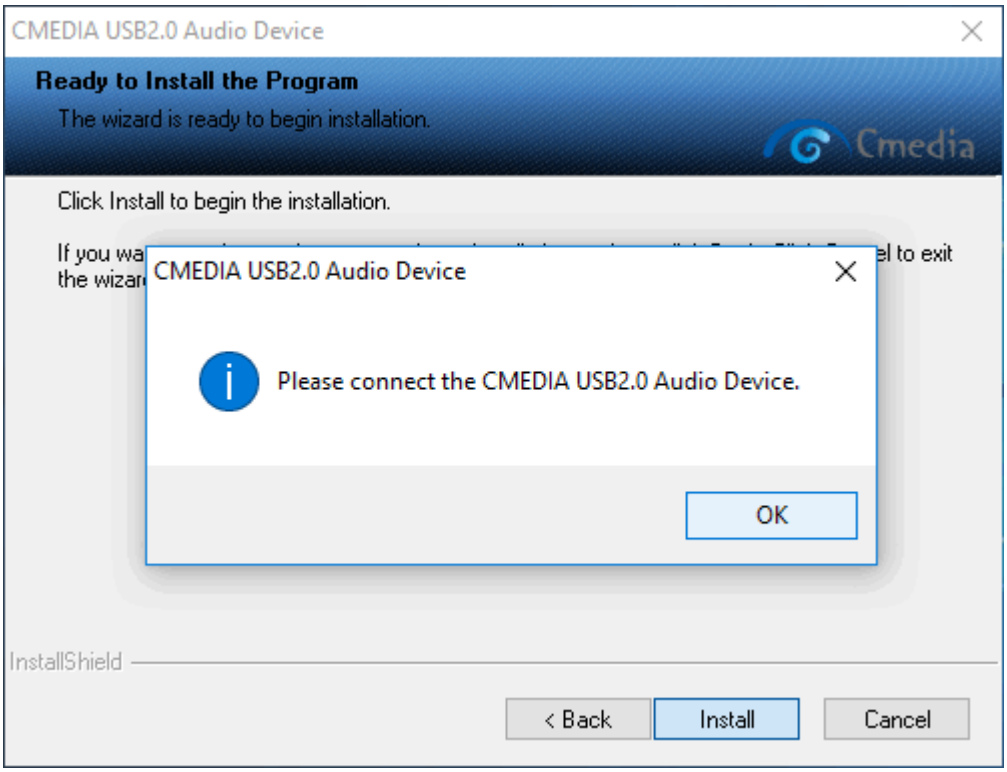
Step 5: Double-click on **setup.exe**. This begins the driver installation.



Step 6: Follow the prompts from the installation program to install the drivers. Click Next.

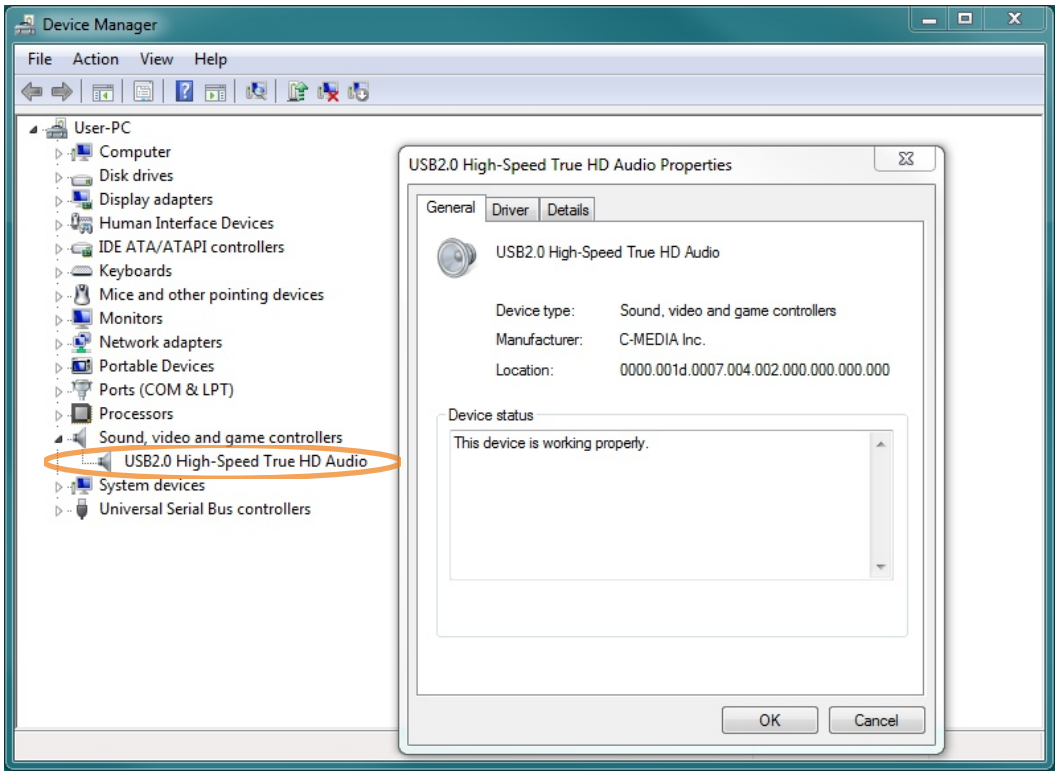
Accept the terms of the license agreement, and click Next, and then Install:

If you not connected LunaDAC-1 device yet, there will be communicate:

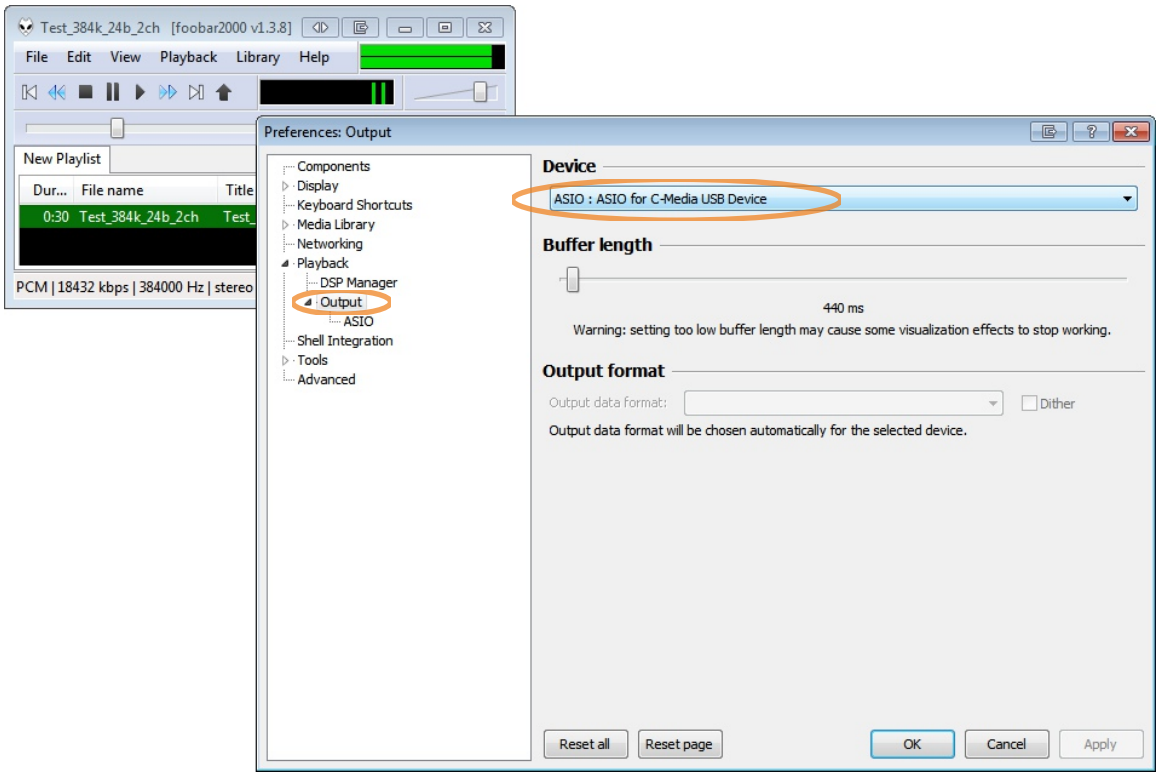


Connect the **LunaDAC-1** device to computer with USB 2.0 cable and click OK. Wait for the installation process and click **Finish** (with checked option „**Yes, I want to restart my computer now**") then wait for system restart. Drivers should be installed and ready for use. You may confirm the installation of the

driver by opening **Device manager** and in the **Sound, video and game controllers** section should be visible **USB2.0 High-Speed True HD Audio** device with speaker icon (without „!" mark). When clicked on **USB2.0 High-Speed True HD Audio** device you should see **This device is working properly** in the **Device status** window undet **General** tab:



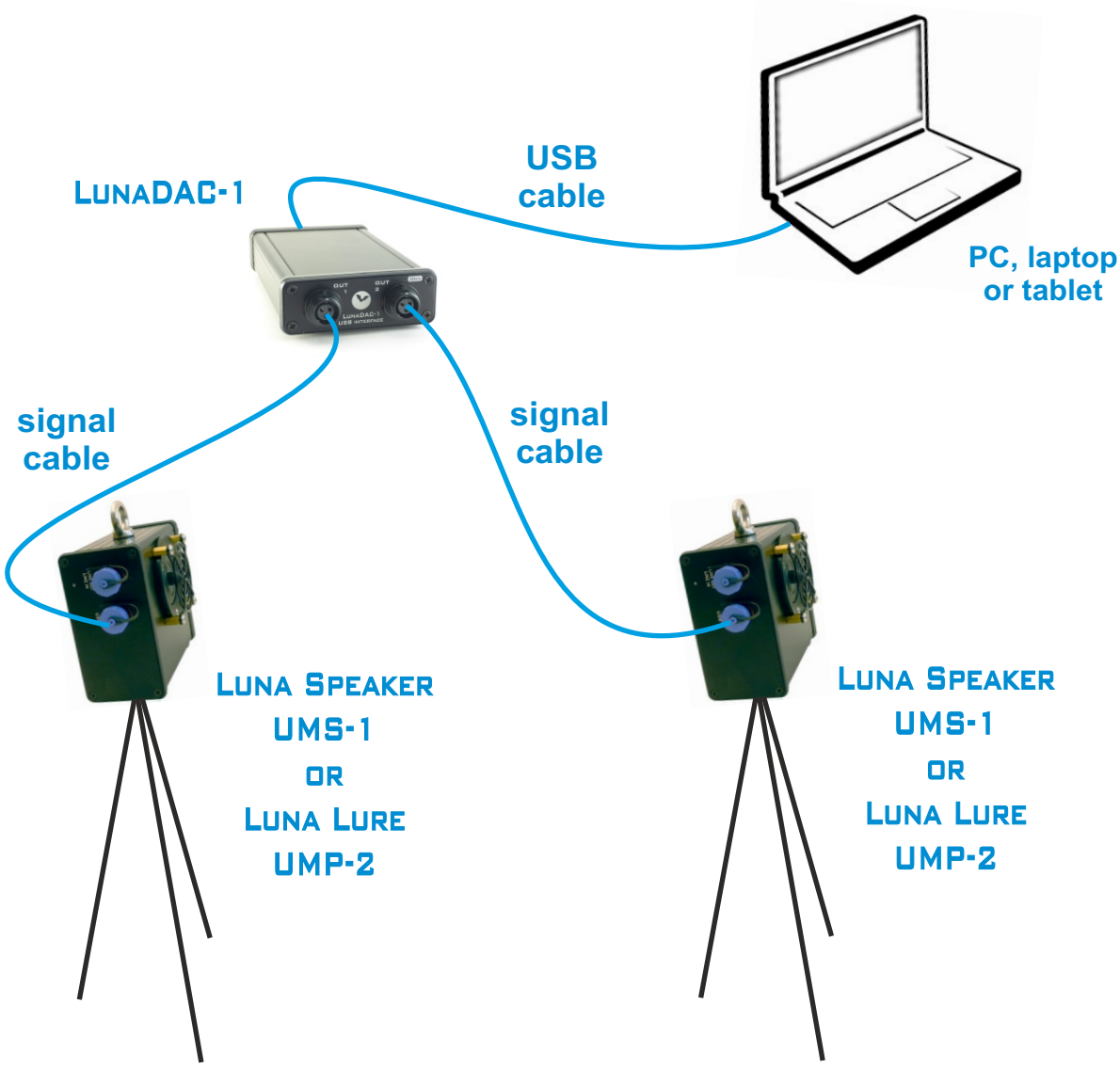
Step 7: In your Control Panel/Audio Devices, select the playback device. Depending on driver version, this may be **ASIO Driver for C-Media USB Device** or **ASIO for C-Media USB Device**.
You may also have to select the device separately in the player software you are using in order to get output. Example from **Foobar** player configuration (with installed **foo-asio-out** plugin):



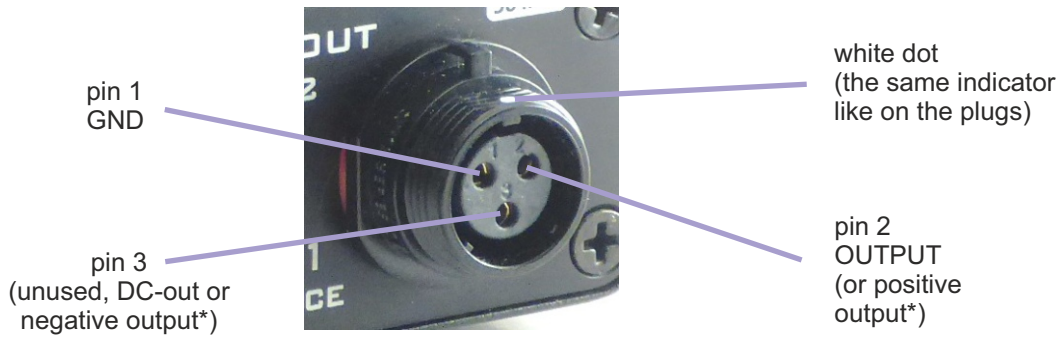
NOTE: DS (DirectSound) drivers uses Windows mixing system, but not allowis to reproduce more than 96kHz signals so the best driver is **ASIO** and **WASAPI** (if there are problems with **ASIO** driver handling)

4. Connecting to output device(s)

Plug the signal cable with male version of 3-pin cable connector(s) to CH1 and/or CH2 output and female connector(s) of the cables to receivers (active speakers, amplifiers etc.):



5. Output connectors



* - in the optional version with balanced outputs

FRONT PANEL:

LINE OUTPUT
CHANNEL 1
CONNECTOR

LINE OUTPUT
CHANNEL 2
CONNECTOR

BACK PANEL:

POWER
INDICATOR

USB INPUT
CONNECTOR