

# ROCKNA

SIMPLICITY IN COMPLEXITY



# WAVELIGHT PRE/DAC

## OWNER'S MANUAL

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## About this document

This manual is meant for the end user of the Rockna Wavelight DAC. It contains an overview of the device's internal architecture, specific handling details, functional description, safety precautions and product warranty details. This document is not meant for service or repair operations, as these must be carried out only by qualified personnel.

More information regarding Rockna Audio and Audiobyte products can be found on-line at the websites owned and operated by the company:

<https://www.rockna-audio.com>

<https://audiobyte.net>

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### Product Features:

25-bit R2R DAC

0.005% R2R THD

117 dB S/N Ratio at 0dB Attenuation

117 dB Dynamic Range

### Wide Selection of Inputs:

S/Pdif (RCA)

AES/EBU

S/Pdif Optical (Toslink)

USB

I2S (HDMI LVDS)

Analog (RCA)

Single-Ended (RCA) and Balanced (XLR) Outputs

Theatre Bypass Option

Custom Digital Filters

Android//iOS Remote Control App

Firmware Upgradeable via USB/App

Black or Silver Case Option

110V/220V Selectable Mains Voltage

## Package Contents

The package you received should contain:

- DAC unit (identifiable by the 7-digit serial number on the back);
- Supply cable;
- DAC black velvet cover.
- User Manual
- Warranty Card



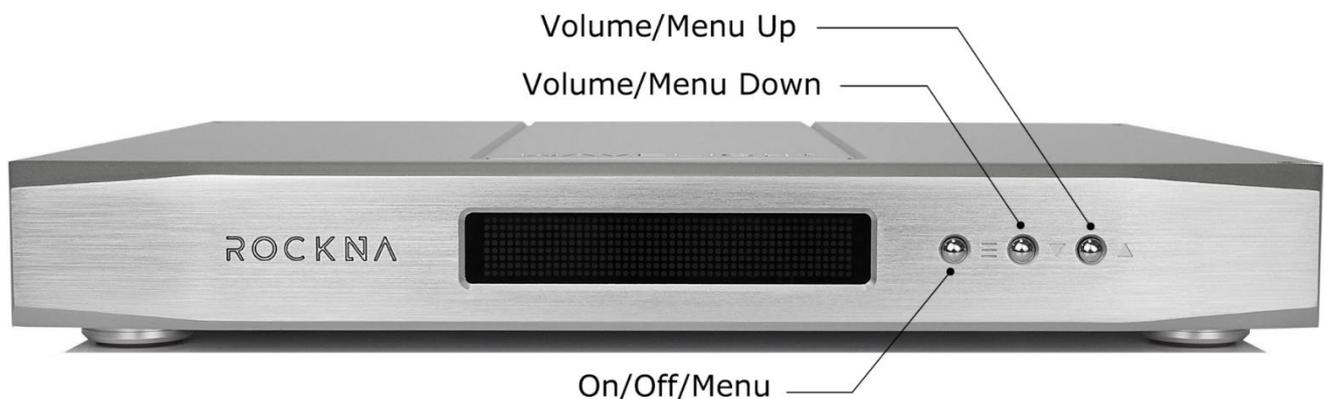
## Safety Precautions

- 1) This device is meant for indoor use only.
- 2) Protect device from excessive heat, humidity and liquid filled objects, such as vases.
- 3) Clean only with dry cloth.
- 4) Do not remove product cover while the device is plugged in the mains outlet.
- 5) Use earth grounded outlet if available.
- 6) Do not move the device while operational.
- 7) Lightning or static electricity can affect normal operation of the device. Make sure that it is unplugged during a thunderstorm.
- 8) Make sure the unit is unplugged if it is not to be used for a long period of time.

## Functional Description

The three buttons on the device front are used as following:

- the MENU button - is used to enter the device's menu, to cycle between menu entries, to turn on the device (short press when in stand-by) and to turn off the device (long-press, 3 seconds or more, when on default screen);
- the UP and DOWN buttons - are used to adjust the volume level (when in default or volume screen) or to select a new option for the active menu entry. Note: Starting with control firmware version 1.21, the volume is adjusted and stored in memory, per active input.



Upon entering the menu, the display will start blinking. If no button is pressed for 5 seconds, the default screen is resumed.

The menu has the following entries and options:

- Input selection
  - Analog;
  - USB;
  - I2S;
  - Optical;
  - XLR;
  - RCA;
  - HT Bypass.

Note: In HT Bypass, the signal present on the RCA analog inputs will be directly routed to the RCA outputs. Beware of the attenuation level of the input signal!

- Mute activation
  - On;
  - Off.

Note: The volume level can still be changed while in Mute On state and will be applied when Mute is disabled;

- Filter selection
  - Linear;
  - Minimum;
  - Hybrid;
  - NOS.
- Phase selection
  - Normal;
  - Inverted.
- Brightness control - 8 brightness levels
- Independent volume by input(from control version 1.21 onwards)
  - Disabled;
  - Enabled.

Note: When independent volume is disabled, the general volume is resumed as the volume of the current input. Nevertheless, the independent levels are stored in memory and can be re-enabled later on.

- Timed display off state
  - Off;
  - On.

If enabled, the DAC display will turn off after 2 seconds of inactivity.

- About screen
  - System firmware versions:
    - the first version is for the audio processing (FPGA) firmware, that can be updated using an update wave file via the USB input;
    - the second version is for the control firmware, that can be updated via the Android/iOS app.

All of the DAC settings are saved in a non-volatile memory, just after a change is done and are resumed on stand-by exit.

## Specifications Sheet

Supply voltage: 110V AC/220V AC – mentioned on the label under the AC inlet;

### DIGITAL INPUTS

S/PDIF RCA	24bit 44.1-192k PCM, DSD64
AES/EBU	24bit 44.1-192k PCM, DSD64
S/PDIF OPTICAL	24bit 44.1-96k PCM
USB	32bit 44.1-384k PCM, DSD64-512
I2S HDMI LVDS	32bit 44.1-384k PCM, DSD64-512

### ANALOG INPUT

Input Max Amplitude (SE)	5.8 Vrms
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### OUTPUT

THD+N: R2R/HYBRID	0.005%/TBD
S/N ratio (0 dB):	117 dB
Dynamic range:	117 dB
Output impedance SE:	50 ohms
Output impedance Balanced:	110 ohms
Output Amplitude (SE/Balanced):	2.4/5.8 Vrms

### OUTPUT SPEC IN PRE MODE (ANALOG INPUT SELECTED)

THD+N (RCA):	-113 dB
THD+N (XLR):	-119 dB
Selectable Gain (RCA):	0/6/9.5 dB
Selectable Gain (XLR):	8/14/17.5 dB

**DIGITAL PROCESSING:**

Memory-based PLL, digital domain only:	300 fS jitter
Custom digital filters:	NOS, linear, minimum and hybrid phase, 8x
Filter type: (advanced convolution)	Parks-McClellan, 2.5K taps
Mathematical precision:	60 bit
Stopband attenuation:	- 135 dB
Passband ripple:	0,00003 dB

## USB Configuration

For the computer playback side, please consider the following information:

Under Win XP environment, kernel streaming (KS) is recommended for PCM, and ASIO for DSD playback.

Under W7/8/10 environment, WASAPI or ASIO mode is recommended for both PCM and DSD playback.

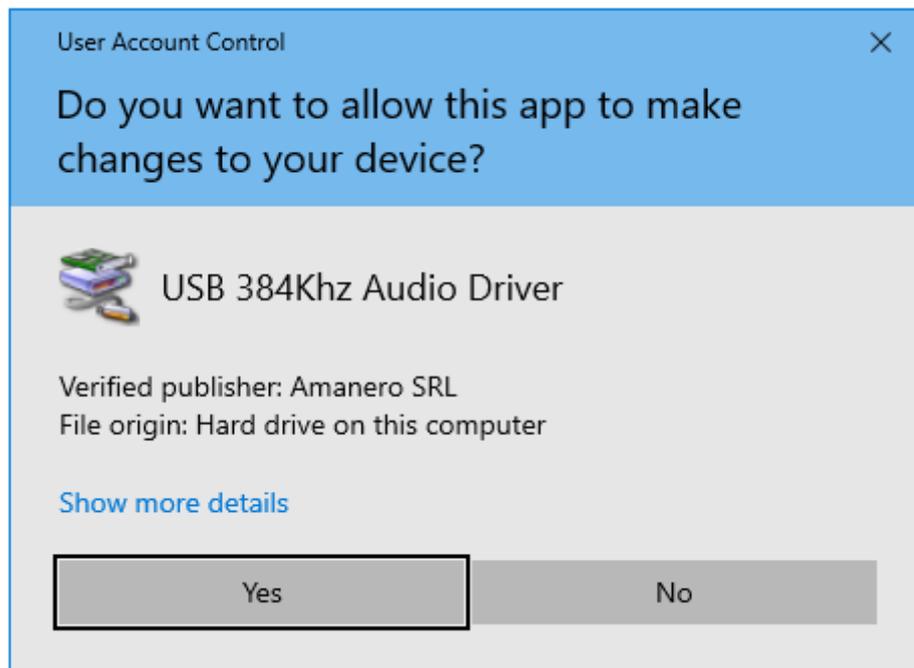
### *USB Driver Installation Details (Windows)*

Note: On MAC and Linux systems there is no need for USB driver installation.

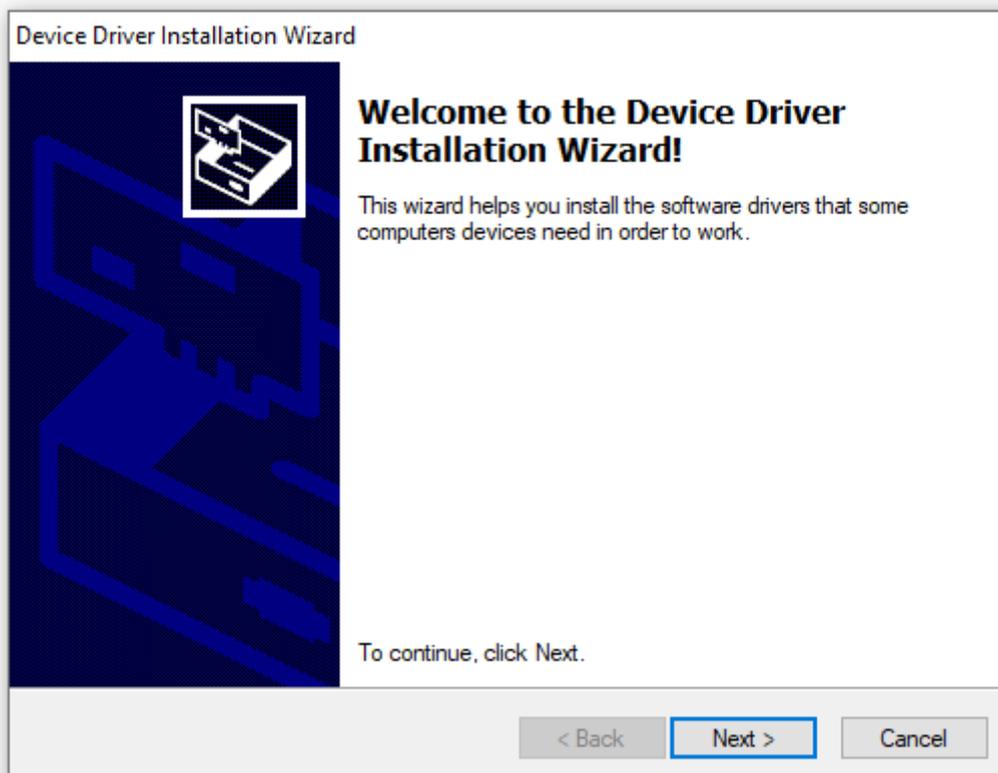
**Do not connect** the USB cable between the DAC and your computer before driver installation! If you have already connected the device to the PC, click Cancel if an installation screen has shown up and remove the USB cable.

1. Download the USB Drivers archive from the bottom of the product webpage:  
<http://www.rockna-audio.com/products/wavelight-dac>
2. Unpack the zip archive.
3. Enter the unpacked Driver W10, Driver w7w8 or Driver xp folder, depending on your operating system.
4. Launch Setup32.exe for 32bit OS or Setup64.exe for 64bit OS.

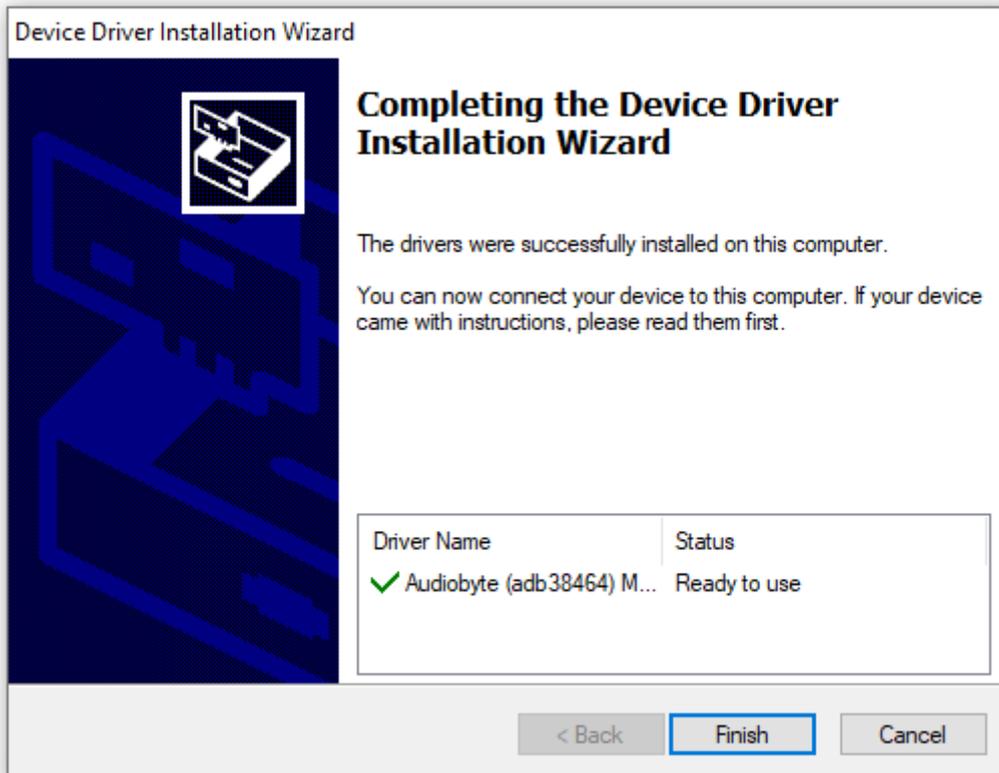
5. Confirm driver installation on your machine.



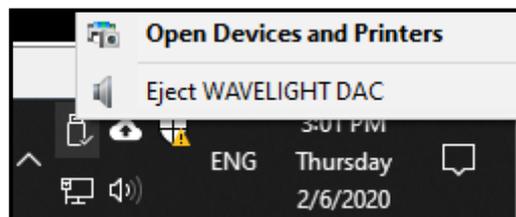
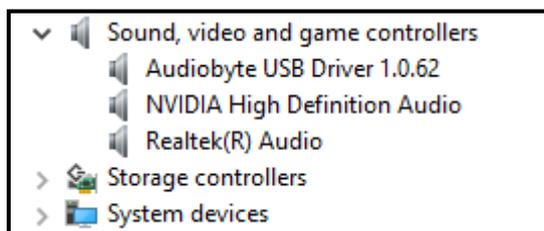
6. After the application launches, click Next:



7. Wait for the driver to be copied and then click Finish:



Now the device should be found in the Windows Device Manager and can be removed using the Safely Remove icon in the taskbar.



## *ASIO Driver Installation Details (Windows)*

Note: We recommend installing the ASIO drivers after the USB ones!

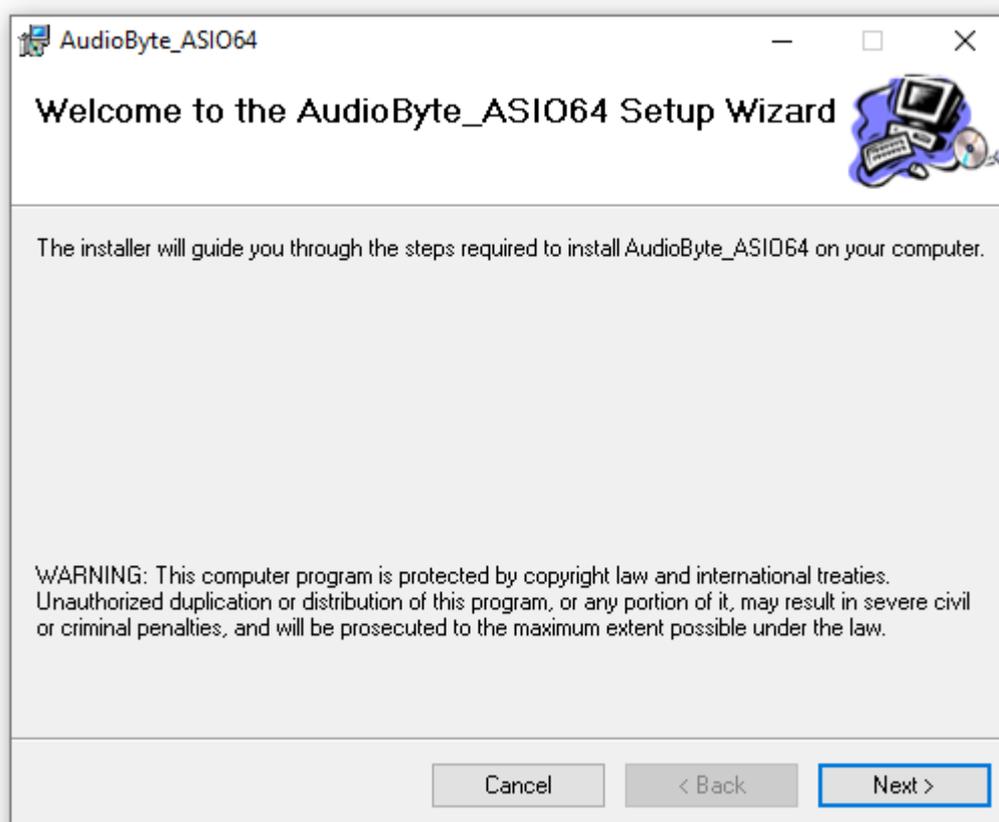
1. The ASIO drivers can be found in the USB Drivers archive that you can download from the bottom of the product webpage:

<http://www.rockna-audio.com/products/wavelight-dac>

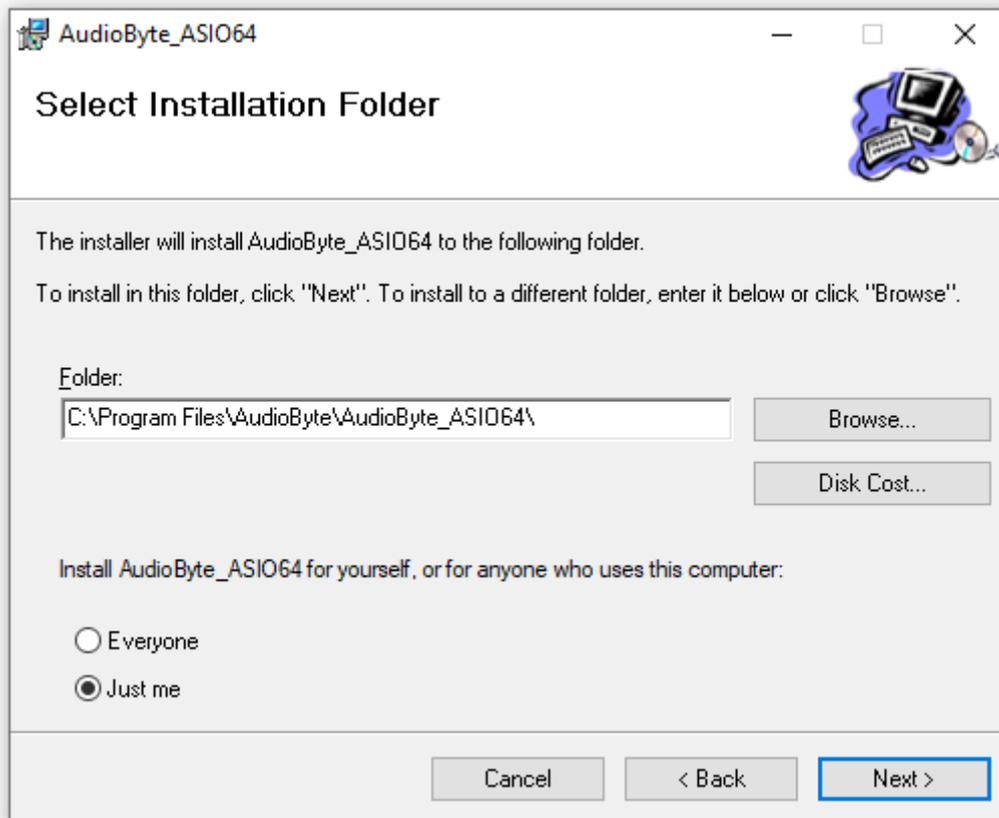
2. Unpack the zip archive.

3. Enter the unpacked ASIO folder.

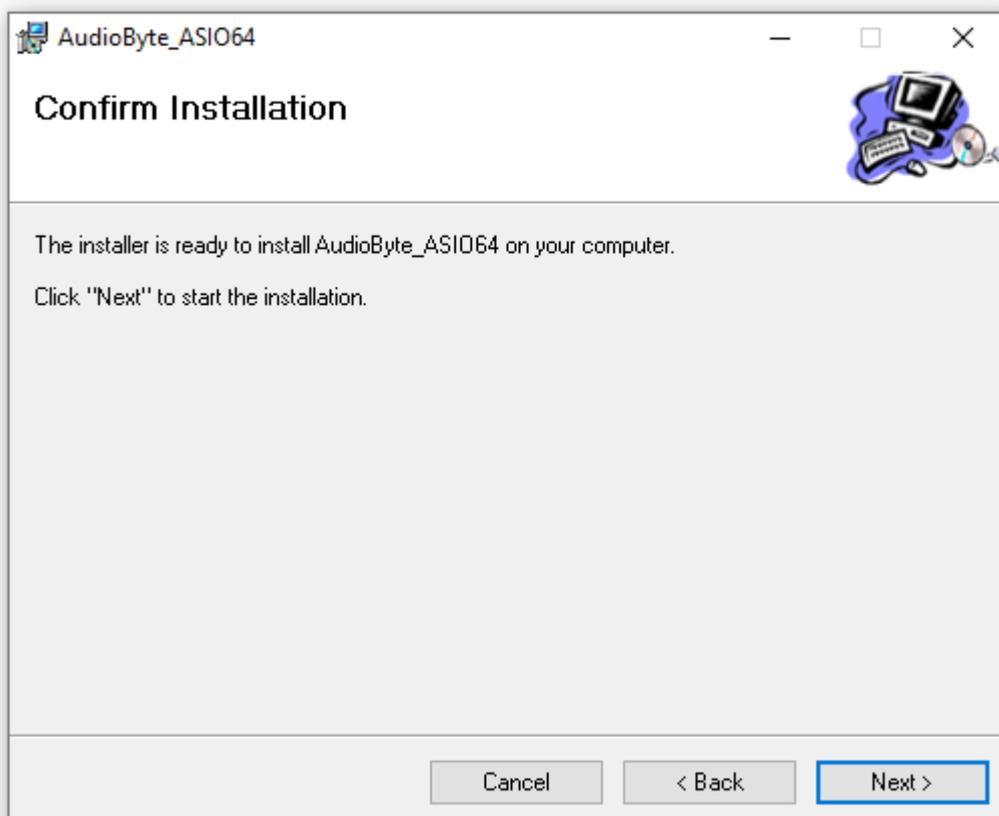
4. Launch SetupASIO32.msi for 32bit OS or SetupASIO64.msi for 64bit OS and click Next to proceed.



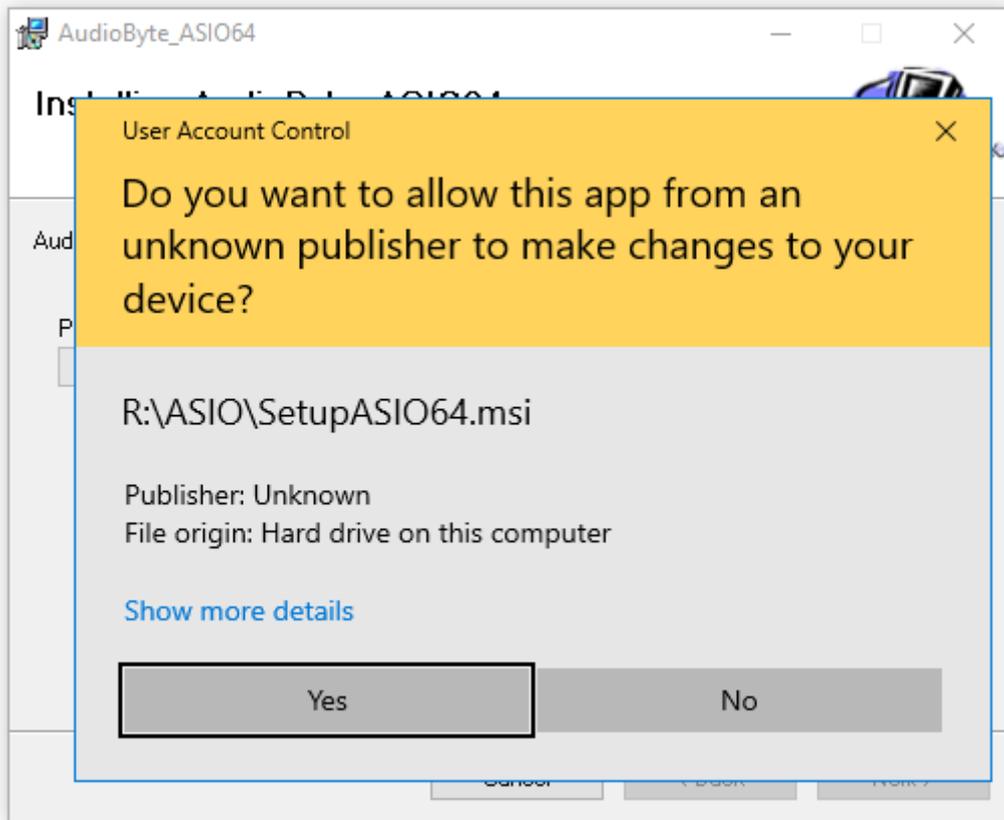
5. Select the installation folder, the users that you want to install for and then click Next.



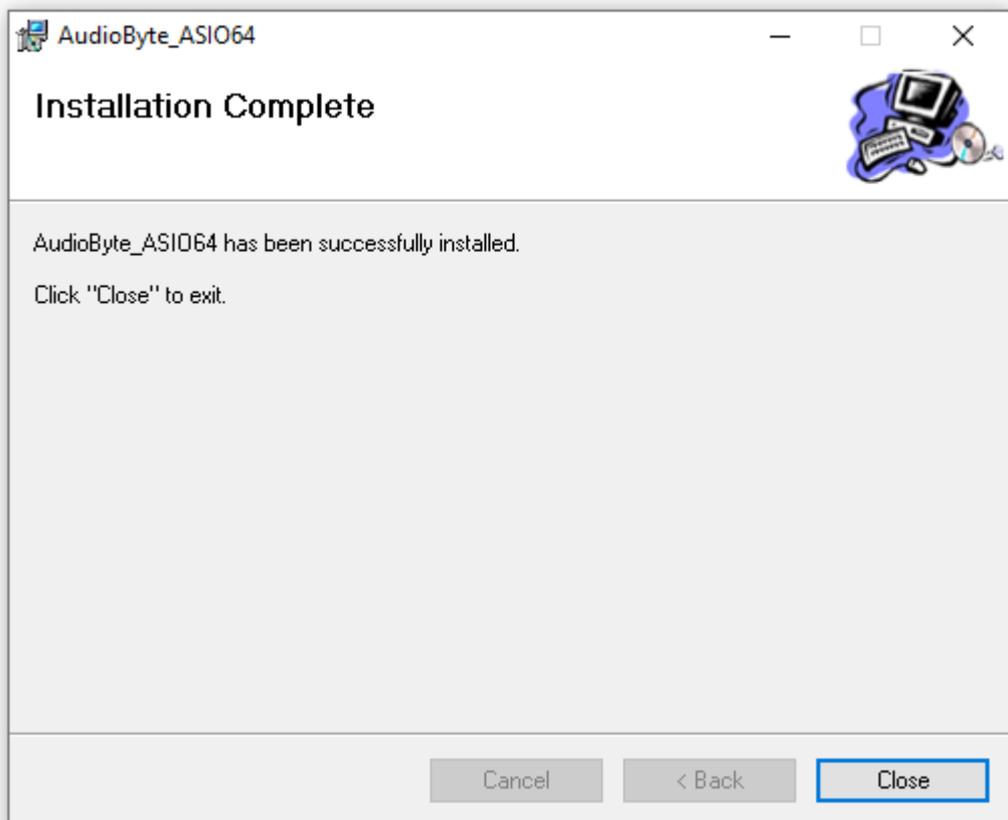
6. Click Next again to start installation.



7. Press Yes to accept the driver to be installed in your system folders.



8. Click on Close after the installation has finished.



## Firmware Update

It is straightforward to update the **FPGA firmware** of the DAC. Just follow the steps below:

1. Set the DAC input on USB;
2. Make sure that on the PC side the playback is bit-perfect (attenuation is set to 0dB, channels are not inverted, no DSP effects are added etc.);
3. Download and unpack the appropriate zip file;
4. Select the DAC as output device and play the .wav update track;
5. During the update process, you will see "UPD." on display. Let the wave file play until the end without changing the volume level or other player parameters;
6. When update is completed successfully, you will see "UPD. DONE" on display;
9. The DAC reboots automatically and enters stand-by. After power-on, check the new firmware version in the device menu(version on the left).

Note: The update will start **only** if currently installed FPGA firmware version and the update wave FPGA firmware version are **different**. Update and downgrade are both possible.

The **control firmware** can be updated using the Android/iOS app, via blue-tooth. Just update the app to the latest version and check if a new control firmware is available(a message saying that new control firmware is available is displayed in the app, when the DAC is in stand-by).

Note: The update is possible **only** if the version available in the app is strictly **higher** than the currently installed control version. Downgrade is not possible.

## Remote Control Application Description and Functionality

Please access the device dedicated app store or the following links or QR codes to download the Wavelight DAC control application:

### Android

<https://www.rockna-audio.com/apps/android/wavelight-dac>



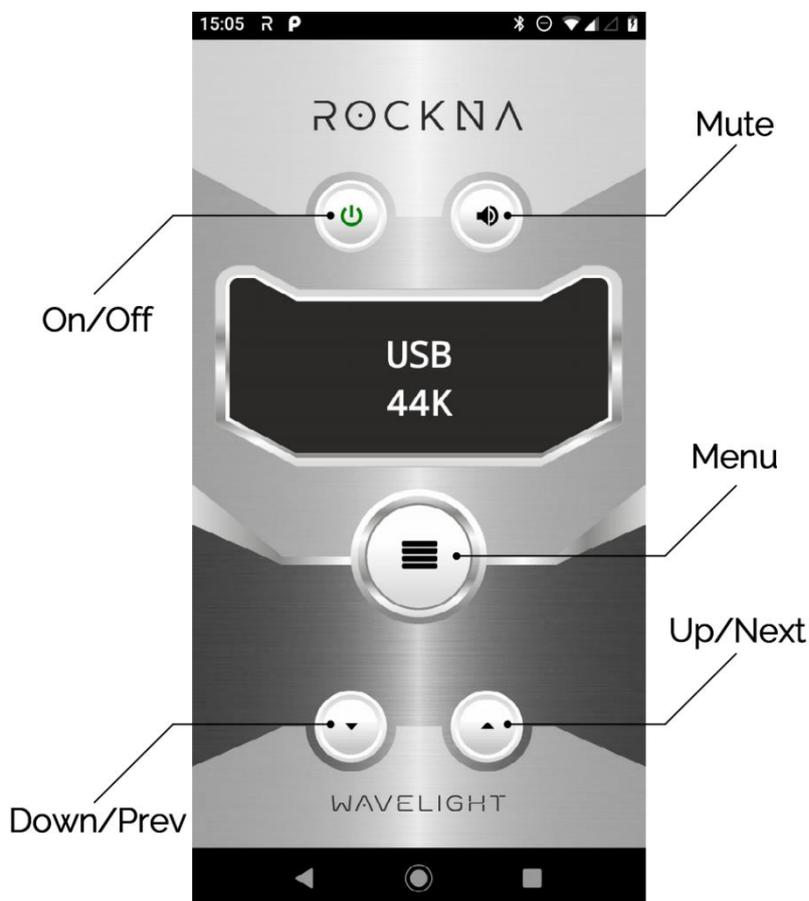


iOS

<https://www.rockna-audio.com/apps/ios/wavelight-dac>

Use the On/Off button to disable/enable the DAC stand-by mode and the Mute button to toggle output mute on or off. Note that in Theatre Bypass mode, the Mute state has no effect.

If screen is in the default mode (input and sample rate are shown), use Up and Down buttons to adjust the volume level.

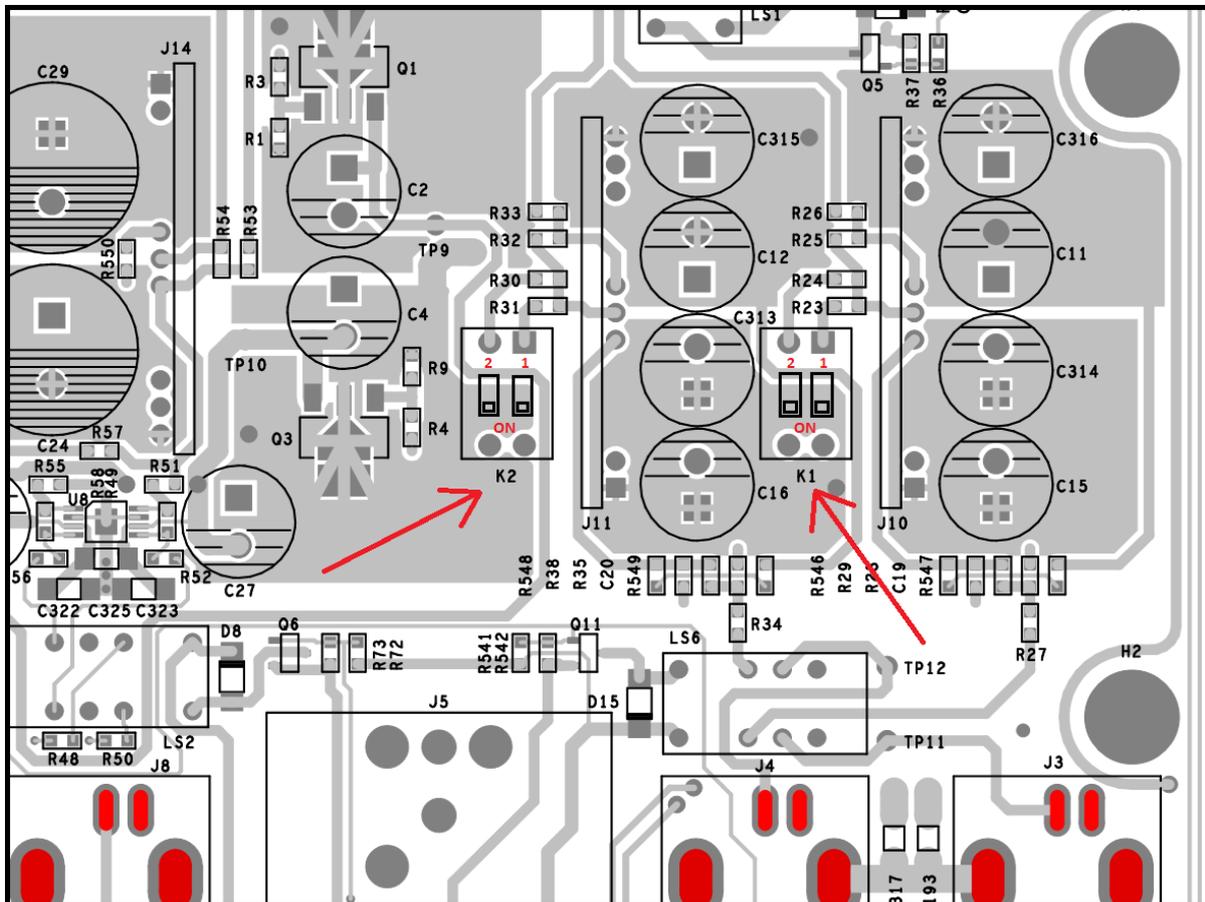


Press the Menu button to enter the input selection screen. Subsequent presses on the Menu button enables the user to cycle between all other DAC options.

Use Prev and Next buttons to cycle between available values of each menu entry. If no press is detected for 5 seconds while in menu, the default screen is resumed.

### Analog Input Gain Setting

To adjust the analog input gain locate K1 and K2 dip switches on the analog board, as indicated on the picture below:



The correspondent output gain(when analog input is selected) depending on the state of the four switches is listed in the following table:

		Right Channel		Left Channel	
RCA	XLR	K2 sw1	K2 sw2	K1 sw1	K1 sw2
0 dB	8 dB	OFF	OFF	OFF	OFF
6 dB	14 dB	ON	OFF	ON	OFF
9.5 dB	17.5 dB	ON	ON	ON	ON

Note: Make sure that the left and right channels always have the same gain settings applied.

## ROCKNA AUDIO LIMITED WARRANTY

### Three (3) Years

#### WARRANTY COVERAGE:

ROCKNA AUDIO warranty obligation is limited to the terms set forth below.

#### WHO IS COVERED:

Rockna Audio warrants the product to the original purchaser or the person receiving the product as a gift against defects in materials and workmanship as based on the date of original purchase from an Authorized Dealer. The original sales receipt showing the product name and the purchase date from an authorized retailer is considered such proof.

#### WHAT IS COVERED:

The Rockna Audio warranty covers new products if a defect arises and a valid claim is received by Rockna Audio within the Warranty Period. At its option, Rockna Audio will either (1)repair the product at no charge, using new or refurbished replacement parts, or (2)exchange the product with a product that is new or which has been manufactured from new, or serviceable used parts and is at least functionally equivalent or most comparable to the original product in Rockna Audio current inventory, or (3)refund the original purchase price of the product. Rockna Audio warrants replacement products or parts provided under this warranty against defects in materials and workmanship from the date of the replacement or repair for one(1) year or for the remaining portion of the original product's warranty, whichever provides longer coverage for you. When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes Rockna Audio's property. When a refund is given, your product becomes Rockna Audio's property.

Note: Any product sold and identified as refurbished or renewed carries a one(1) year limited warranty. Replacement product can

only be sent if all warranty requirements are met. Failure to follow all requirements can result in delay.

#### WHAT IS NOT COVERED - EXCLUSIONS AND LIMITATIONS:

This Limited Warranty applies only to the new products manufactured by or for Rockna Audio that can be identified by the trade-mark, trade name, or logo affixed to it. This Limited Warranty does not apply to any non-Rockna Audio hardware product or any firmware, even if packaged or sold with the product. Non-Rockna Audio manufacturers, suppliers, or publishers may provide a separate warranty for their own products packaged with the bundled product. Rockna Audio is not liable for any damage to or loss of any programs, data, or other information stored on any media contained within the product, or any non-Rockna Audio product or part not covered by this warranty. Recovery or reinstallation of programs, data or other information is not covered under this Limited Warranty.

This warranty does not apply (a)to damage caused by accident, abuse, misuse, misapplication, or non-Rockna Audio product, (b)to damage caused by service performed by anyone other than Rockna Audio or Rockna Audio Authorized Service Location, (c)to a product or a part that has been modified without the written permission of Rockna Audio, or (d)if any Rockna Audio serial number has been removed or defaced, or (e) product, accessories or consumables sold "AS IS" without warranty of any kind by including refurbished Rockna Audio product sold "AS IS" by some retailers.

#### This Limited Warranty does not cover:

- Shipping charges to return defective product to Rockna Audio.

- Labor charges for installation or setup of the product, adjustment of customer controls on the product, and installation or repair of systems outside of the product.
- Product repair and/or part replacement because of improper installation, connections to improper voltage supply, abuse, neglect, misuse, accident, unauthorized repair or other cause not within the control of Rockna Audio.
- Damage or claims for products not being available for use, or for lost data or lost firmware.
- Damage occurring to product during shipping.
- A product that requires modification or adaptation to enable it to operate in any country other than the country for which it was designed, manufactured, approved and/or authorized, or repair of products damaged by these modifications.
- A product used for commercial or institutional purposes(including but not limited to rental purposes).
- Product lost in shipment and no signature verification receipt can be provided.
- Failure to operate as per Owner's Manual.

REPAIR OR REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY FOR THE CONSUMER. ROCKNA AUDIO SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ON THIS PRODUCT. EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON THIS PRODUCT IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY.

Some states do not allow the exclusions or limitation of incidental or consequential damages, or allow limitations on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you.

## Frequently Asked Questions

Q: What does NOS mean?

A: It stands for „no over-sample”. If this setting is selected, the audio stream is not over-sampled and no filter is applied to it.

Q: Is the volume control active in NOS mode?

A: Yes, volume control is active in NOS mode, unless Theatre Bypass is selected.

Q: What exactly is Theatre Bypass?

A: In this mode, the analog RCA inputs are connected directly to the analog RCA outputs through a mechanical relay.

Q: What does 8x digital filters mean?

A: 8x means that the input is always up-sampled to 352kHz or 384kHz depending on the base frequency (44kHz or 48kHz) and the filters are applied to that signal.

So, for example, if the input sample rate is 192kHz, its base frequency is 48kHz, so the input will be up-sampled to  $8 \times 48 = 384$ kHz and then the filters applied to it.

## Document Revision History

Version	Date	Description
1.00	04-17-2020	Initial release
1.01	05-05-2020	Modified styles and fonts, added DAC front in functional description, updated USB installation screens, changed USB configuration paragraph, added volume per active input menu entry, added user manual and warranty card in package contents
1.02	05-14-2020	Added app download links and QR codes
1.03	05-15-2020	Added ASIO driver installation instructions
1.04	05-18-2020	Added analog input gain adjust information

