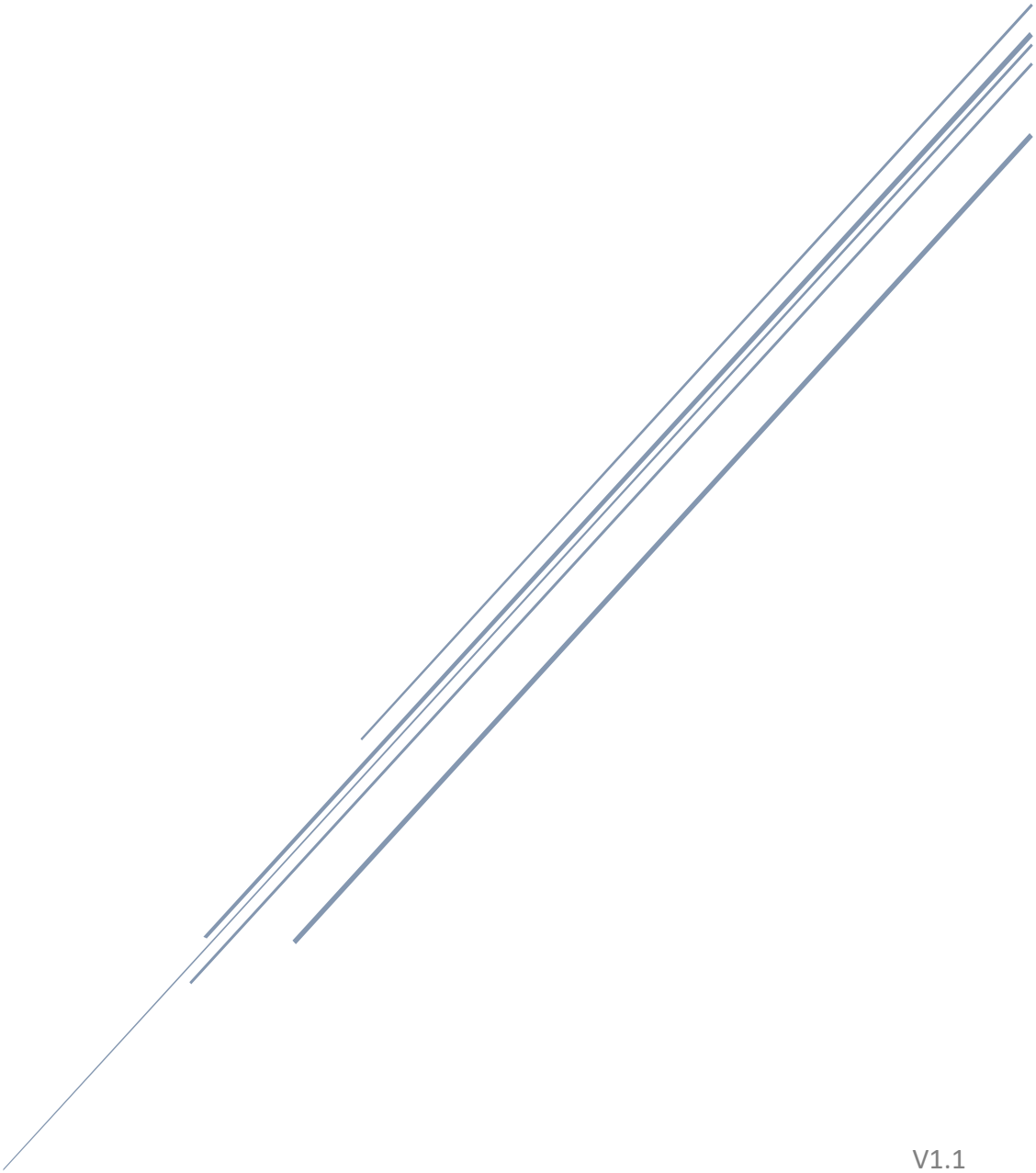
DENAFRIPS

ARES 12TH DAC

OWNER'S MANUAL



V1.1
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Contents

1. INSTALLATION & SAFETY INSTRUCTIONS

This DAC is designed and built to provide trouble-free performance, but as with all electronic devices it is necessary to observe a few precautions:

- Unpack the DAC carefully.
- Position the DAC on a stable, horizontal surface, i.e. sturdy rack.
- The DAC supports voltage 100-250VAC worldwide voltage by a voltage selector. The voltage selector can be found at the bottom of the DAC. Switch it to the correct voltage prior to powering it up, i.e. 115V for the US / 230V for the EU.
- Please connect the AC power cord with earth(ground) pin unless it is absolutely required to reduce hum from the ground loops of the connected devices.
- Always ensure that when disconnecting and reconnecting your audio equipment the mains supply is turned off.
- Position the power cord and signal interconnects where they are not likely cause trip and fall hazard.
- Do not use the DAC near water, or place water-filled containers on the DAC. Entry of liquid into the DAC is hazardous and may cause electric shock and/or fire hazard.
- Do not place the unit under direct sunlight or heat source.
- Do not remove any covers or try to gain access to the inside. There are no user adjustments or fuses to change without qualification.
- Clean regularly with a damp soft cloth. Do not use any cleaning agents as it might damage the surface finishing.
- The electronics in modern hi-fi equipment is complex and may, therefore, be adversely affected or damaged by lightning. For protection of the audio system during electrical storms, disconnect the mains plugs.

2. INTRODUCTION

Thank you for purchasing the DENAFRIPS ARES 12TH DAC.

The ARES 12TH DAC is built with a sole objective in mind - to reproduce digital music to analogue-like sound for today's audiophile. The use of advanced hardware design, powerful digital processing technology, combined with the know-how of recording and reproduction experiences, ARES 12TH DAC achieved the digital music playback goals - musical expression.

The architecture uses the most primitive R-2R DAC technology, it is probably the most suitable architecture to reproduce music. Despite the test results of various measurements and parameters of the conventional R-2R DAC *may* usually not as good as the mainstream integrated DAC chip, but the sound of R-2R DAC, is often filled with emotion, relax, high resolution, and additive musicality that most of the common mainstream integrated DAC chip cannot match.

3. DESIGN HIGHLIGHTS

3.1 ADAPTIVE FIFO BUFFER RECLOCKING

The DENAFRIPS approach to address the jitters issue by FIFO BUFFER RECLOCKING. The adaptive FIFO buffer store the source digital audio data in the memory. These data are read from the memory using the low phase noise, precision FEMTO Clock, located right in the DAC.

This technology is close to the perfection, especially so with the local FEMTO Clock. The jitter is so small that it can be neglected.

3.2 PROPRIETARY, STATE-OF-THE-ART USB INTERFACE

The ARES 12TH is equipped with the proprietary USB Audio Solution, powered by STM32F446 Advanced AMR Based MCU. DENAFRIPS redesigned and optimized circuitry, allow the DAC to be used as high-end DAC with computers / streamers. It supports 24bit/1536kHz* PCM data stream, and native decoding of DSD up to DSD1024*. It comes with licensed THESYCON USB Driver for Windows Platform.

NOTE: The USB Module is designed to trigger on *only* when USB Input is selected. This is intended design to reduce digital input interfaces cross-interference for best sound reproduction. *High res support may vary depending on system compatibility.

3.3 PROPRIETARY SPDIF DIGITAL AUDIO RECEIVER

The SPDIF Coaxial, Optical, input support up to 24bit/192kHz digital audio format. The ARES 12TH abandon the use of Digital Audio Receiver chip. The digital data is decoded by the on-board FPGA (Field Programmable Gate Array), signal path is shortened and eliminated the undesirable coloration.

3.4 NOS/OS

The ARES 12TH allow the user to change the sampling mode on the fly.

NOS, as the name suggested, does not over-sampling to digital input data.

In OS mode, the PCM 44.1kHz or 48kHz based audio data are up-sampled to the maximum rate of PCM1411.2 or PCM1536. There is no up-sampling of DSD audio signal.

3.5 PROPRIETARY R-2R AND DSD DECODING ARCHITECTURE

The ARES 12TH is equipped with 24Bit R-2R DAC to decode PCM data stream and 32 steps FIR analogue filters hardware decoder to decode DSD data stream. These designs guaranteed the PCM format can be perfectly decoded, at the same time, the DSD format can be perfectly decoded as well. It is rare in the currently market that a R-2R DAC can hardware decode both the PCM and DSD formats.

3.6 DAC ARCHITECTURE

DIGITAL SIGNAL PROCESSING – All digital input data are stored in the on-board FPGA high-speed RAM.

FEMTO CLOCK – These data are read from the memory using the low phase noise, accurate FEMTO Clock, located right in the DAC. The processed data are sent to the final stage Discrete R-2R for DA conversion.

R-2R LADDER NETWORK – The data bits are converted to analogue signal by the true balanced R-2R ladder network arrays. The linearity of the conversion is guaranteed by the high-precision thin film resistors, with low thermal effect temperature coefficient of the low 10/15ppm.

4. OPERATING INSTRUCTION

4.1 Quick Start Guide

The ARES 12TH II is easy to use. Nonetheless, please read this section to fully understand the functions and features available.

Figure 1. ARES 12TH II Front Panel

Description:

(1) Standby Button

Press the button once to switch on the DAC, vice versa, press once to switch the DAC into standby mode.

(2) Standby LED

The Standby LED shall be on when the DAC is in Standby Mode. The LED shall be dimmed when the DAC is in Operating Mode.

(3) Input Selection: USB

Press the button to select USB as current input source. The respective LED shall be on.

(4) Input Selection: COAXIAL

Press the button to select COAXIAL as current input source. The respective LED shall be on.

(5) Input Selection: OPTICAL

Press the button to select OPTICAL as current input source. The respective LED shall be on.

(6) Input Selection: I^2S

Press the button to select I^2S as current input source. The respective LED shall be on.

(7) OS/NOS

Press the button to toggle OS/NOS Mode. NOS LED On: NOS Mode, NOS LED Off: OS Mode

(8) Phase Button

Press the button to toggle Phase Output. Phase LED On: Positive Phase, Phase LED Off: Negative Phase

(9) Mute Button

Press the button to enable/disable Mute. When mute, the Mute LED on.

(10) Digital Audio Signal Input Sampling Rate

The following table illustrate the Input Sampling Rate LED status.

Base Sampling Rate	Multiplier	Input Format
44.1 kHz	1X	44.1 kHz
	2X	88.2 kHz
	4X	176.4 kHz
	8X	352.8 kHz
	16X = 2X + 8X	705.6 kHz
	32X = 4X + 8X	1,411.2 kHz
48 kHz	1X	48 kHz
	2X	96 kHz
	4X	192 kHz
	8X	384 kHz
	16X = 2X + 8X	768 kHz
	32X = 4X + 8X	1536 kHz
DSD	1X	DSD 64
	2X	DSD 128
	4X	DSD 256
	8X	DSD 512
	16X = 2X + 8X	DSD 1024

Table 1. Sampling Rate

Parameter Settings:

Filter Selection (Effective in OS Only):

1. Press the Mute button once to enter configuration mode
2. Toggle the OPT button momentarily
   - NOS LED On = Slow Filter
   - NOS Off = Sharp Filter
3. Wait for 5s
4. ARES 12TH II back in operational mode

I²S Pin-Out Configuration:

1. Select I²S Input
2. Press the Mute button once to enter configuration mode
3. Toggle the I²S button momentarily, 1X 2X 4X will turn on/off in a fixed pattern to denote binary 000-111
4. Wait for 5s
5. DAC back in operational mode

Video Guide:

https://www.denafrips.com/config-ARES 12TH

I²S Pinout Configuration

MODE	LED				I2S PINOUT						
	1X	2X	4X		PIN	DATA		BCK		LRCK	
	DATA	BCK	LRCK		MODE	1	3	4	6	7	9
0	0	0	0		0	DATA-	DATA+	BCK+	BCK-	LRCK-	LRCK+
1	1	0	0		1	DATA+	DATA-	BCK+	BCK-	LRCK-	LRCK+
2	0	1	0		2	DATA-	DATA+	BCK-	BCK+	LRCK-	LRCK+
3	1	1	0		3	DATA+	DATA-	BCK-	BCK+	LRCK-	LRCK+
4	0	0	1		4	DATA-	DATA+	BCK+	BCK-	LRCK+	LRCK-
5	1	0	1		5	DATA+	DATA-	BCK+	BCK-	LRCK+	LRCK-
6	0	1	1		6	DATA-	DATA+	BCK-	BCK+	LRCK+	LRCK-
7	1	1	1		7	DATA+	DATA-	BCK-	BCK+	LRCK+	LRCK-

Table 1. I2S PINOUT CONFIGURATION

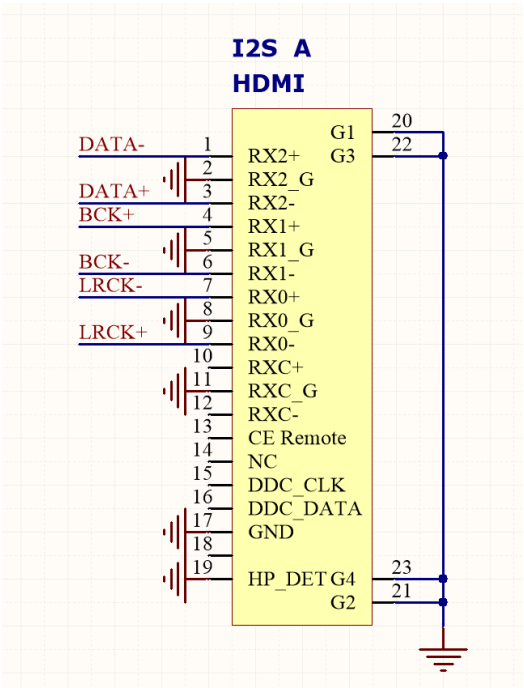


Figure 1. HDMI i2s Input

Figure 2. ARES 12TH II Rear Panel

Description:

(1) AC Power Supply

CAUTION! Select the correct AC Power Supply voltage prior supplying the power to the ARES 12TH II. The voltage selector switch is located underneath the ARES 12TH II chassis.

(2) Digital Audio Signal Input

There are 4 inputs, namely, USB, COAX, OPT and I²S.

(3) Analog Audio Signal Output

Balanced output via XLR (pin2 hot), singled ended output via RCA. The ARES 12TH II is a true balanced DAC, we recommend using balanced output whenever possible. The RCA and XLR output are shared, please use either of the output at a time. It is not recommended to use both RCA and XLR output simultaneously.

NOTE:

The ARES 12TH II chassis is connected to the power supply earth.

4.2 USB DRIVER INSTALLATION – WINDOWS OS

USB driver is required for Windows Operating System (Windows 7/8/8.1/10, X86/X64). The USB driver is licensed by THESYCON to provide the highest quality audio playback for Computer Audio System.

NOTE: Mac and Linux OS do not require the USB driver.

Installation Guide:

- Download the driver from the support page: https://www.denafrips.com/support
- Do not connect the USB cable from the computer to the DAC. Remove it before the USB driver installation
- Double click the "DENAFRIPS_UsbAudio_v4.82.0" (or the latest version) to install the USB driver.
- Follow the on-screen instruction to complete the installation

Figure 2. Welcome screen

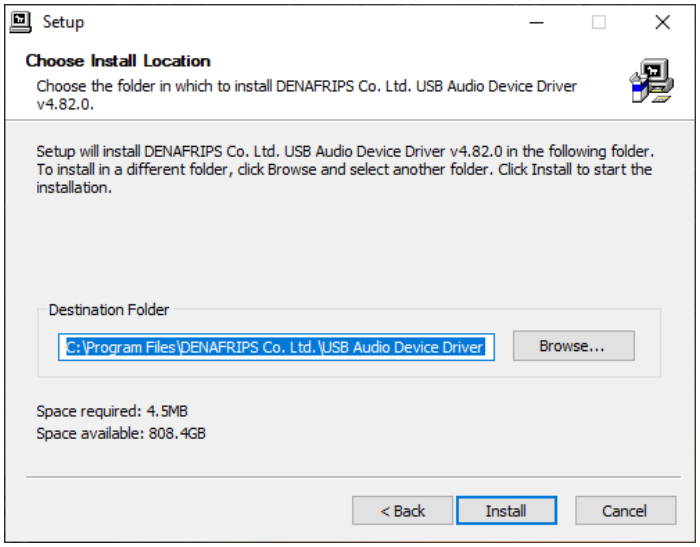


Figure 3. Default Installation Directory

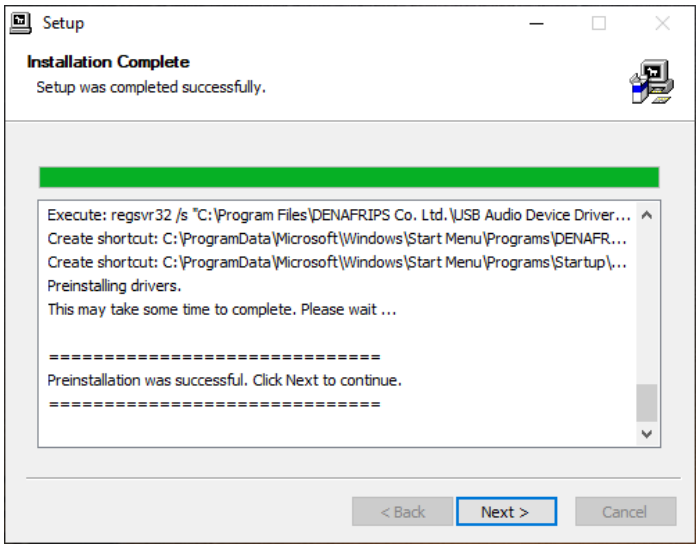


Figure 4. Preinstallation Successful

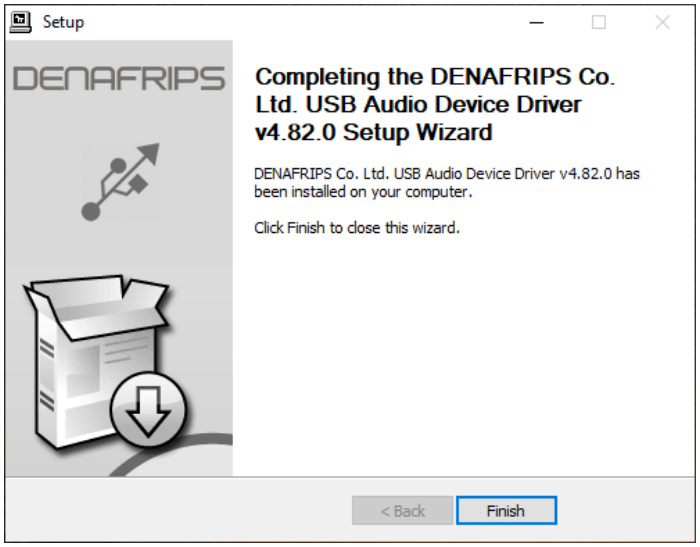
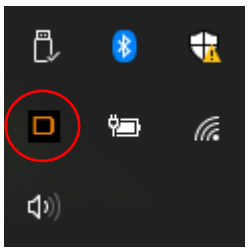


Figure 5. Completed

- Restart the computer to complete the installation
- Connect the USB cable to the DAC
- Power on the DAC. Select USB input
- The USB DAC shall be detected. The driver status can be monitored as follows



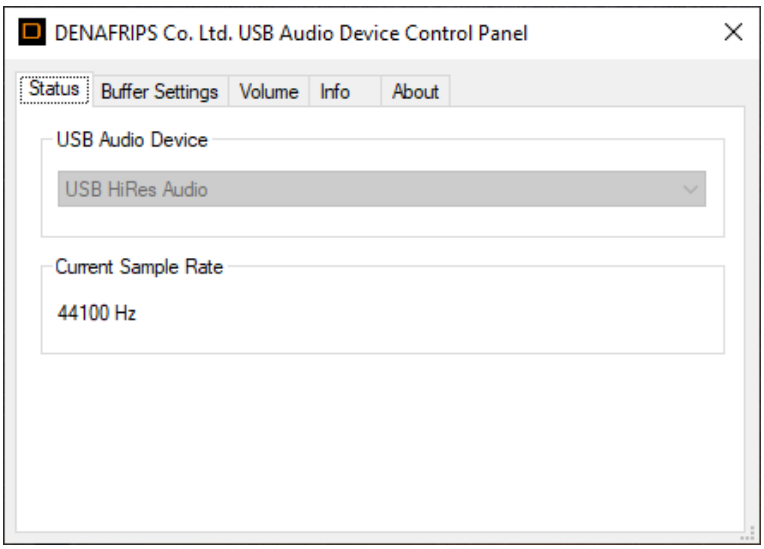


Figure 6. Taskbar & Control Panel

- Select DENAFRIPS USB DAC as default Windows OS Soundcard

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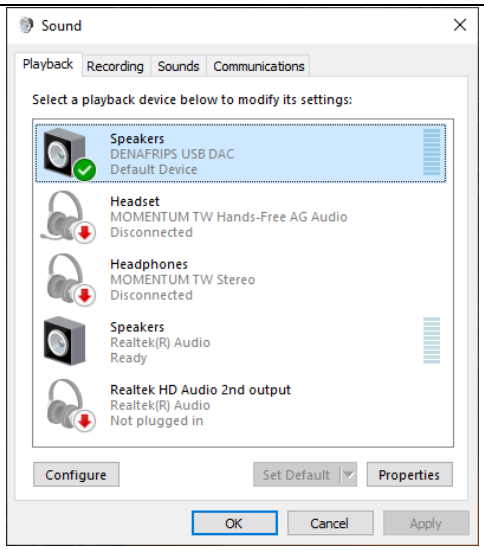
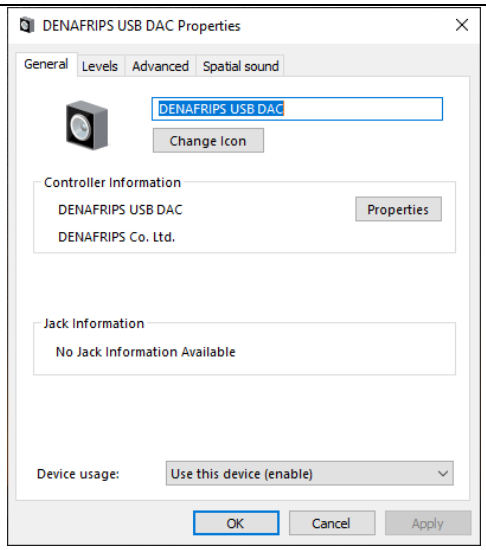
<tr><td> 
</td><td> 
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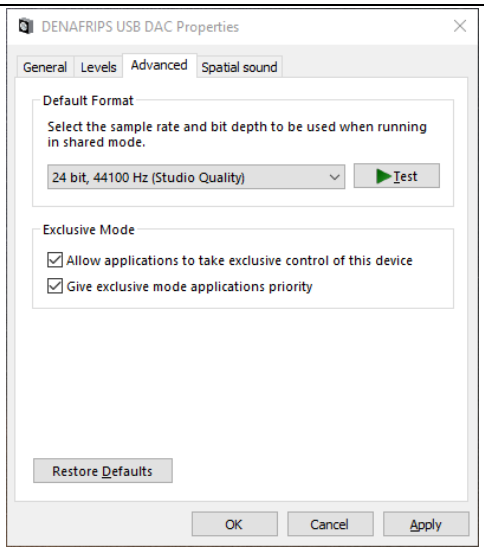
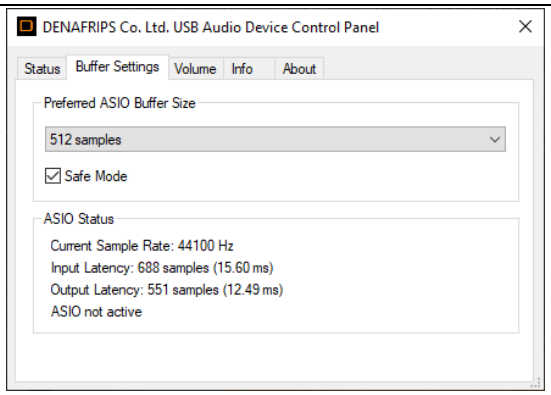
<tr><td>Press Set Default button</td><td>Properties of the DENAFRIPS USB DAC</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>Direct-Sound default format</td><td>ASIO Buffer Size</td></tr>
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Playback software recommendation:

- roon
- JRiver
- Foobar2000
- Sonicstudio Amarra

5. SPECIFICATIONS

Description	Parameters
AC Power	115/230V, 50/60Hz
Power Consumption	< 30W
Frequency Response	0-70K Hz(-3dB)
THD+N	≤0.004%(1KHz A-weighted)
Output (RCA)	2.2(+/-10%) V RMS(1KHz)
Output (XLR)	4.4(+/-10%) V RMS(1KHz)
Supported Format (DSD)	DSD64 All Input DSD64 – DSD1024 USB Only
Supported Format (PCM)	24bit/44.1, 48, 88.2, 96, 176.4, 192 kHz All Input 44.1 – 1536 kHz USB Only
S/N Ratio	115dB(RCA), 114dB(XLR)
Dynamic Range	>119dB(RCA), >120dB(XLR)
Stereo Crosstalk	≤-124dB(RCA), ≤130dB(XLR)
Dimension	215 *230 *45 mm
Weight	3.5kg

6. WARRANTY

DENAFRIPS ARES 12TH purchased from the Authorized Distributor comes with 36 months of warranty from the date of purchase / delivery (whichever later).

Defective Within	Warranty Policy
First 30 Days	DENAFRIPS to bear both way shipping fee.
Within 1st Year	Customer to bear one-way shipping fee. DENAFRIPS shall cover the return shipping fee.
Within Warranty Period	Customer to bear both way shipping fee. DENAFRIPS to repair at free of charge.
Out of Warranty	Customer to bear both way shipping cost. DENAFRIPS to provide repair / maintenance services at cost.