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A quick guide to a smooth start

THE RING BUTTON
the ring has a function of USB to NON-USB switch.

VOLTAGE: All DACs are shipped with the voltage of MAINS according to the country of destination. If you bought the DAC second hand and you are in different voltage zone - the DAC can be converted by a throw of a switch at the back.

It is not necessary, but advisable that the power cable used is a quality one, not simply a computer cable. It is also advisable to use some kind of AC filter – in many cases this brings nice results. Generally under-filtering is better than over-filtering.

Due to multitude of AC plugs around the world - we dont supply any AC cable at all.
Introduction

Thank you for choosing the BEST300B (Lampizator) DAC. We created it with huge research effort to deliver not only world class musical performance, rivalling the most expensive DACs money can buy, but also to offer very long life of the product. Simply speaking – if you adhere to some basic precautions listed below – the product should last a lifetime and hopefully in this period – will never be outperformed by a competing product.

“Whose lifetime?” one might ask – well – let’s not go into details – enough to say it should work flawlessly for the foreseeable future.

We can’t be 100% sure, but it is extremely unlikely that the market and the industry in the future will embark any technology of music storage faster than 192 kHz and with more resolution that 24 bits. We already hit the human ear limits, not to mention the real needs of mass consumers (MP3).

Data formats

The DAC is capable of automatic recognition of all sampling rates from 32 to 384 kHz and bit rates from 16 to 32. Since few if any transports offering SPDIF format of the 192 kHz exist in the consumer market, it is hard to guarantee the operation but on the professional ones which we tried – it worked. From our experience the transmitters of SPDIF are incapable of making good square wave over 48 kHz, so if you play a 192 kHz file, be aware that on one hand you “play” more detailed data, but at the same time your signal is waaay more distorted so at the end of the day for this reason alone it may not be worth it to chase the hi-rez rabbit.

If you use USB connection, all our DACs will play up to 384kHz and 32 bits. This theoretical limit does not imply that you need RECORDINGS of that resolution, which don’t exist by the way, but that you can use up sampling to play regular files. We however listen to all recordings at the resolution settings they were recorded.

By PCM files we mean all known file formats like: MP3, MP4, Aiff, Flac, WMA, WAV, Ogg, Ape and many more less known types. PCM abbreviation stands for pulse code modulation.

DSD

Direct Stream Digital, also known as DSD format - this format is not new as many people think, it is as old as digital but it wasn’t used for consumer audio or home audio - before. It became very popular after 2010 and continues to make its way into our homes. It is VERY different than our well known PCM format as found in our CD files, MP3, FLAC or WAV - AIFF. It encodes the music in the data stream differently, looks
different and sounds different. It is the format in which the SACD discs were recorded and a format in which the analog master tapes were backed up by record companies. It is currently the format in which some master recordings are made in record industry.

In ATLANTIC DAC - for the first time we use AUTOSENSING and automatic switch from DSD to PCM and back. Used doesn't need to do anything just enjoy.

BEST300B DAC will automatically recognize and switch all DSD speed rates from normal 64 SACD format to 2x (128x) and quad 256x format. 512 is not supported.

We believe that 256 is the maximum reasonable speed and going faster makes no sense.

Audio volume level

Tube technology allows us to set practically unlimited volume level at the output, up to 100 x higher than from a normal CD player. We have decided to adhere to one internally set standard: the test tone of 1 kHz at -20 dB produces an output of sine wave 300 mV AC under the amp load of 47K. That's equivalent of circa 3 V pp. Shall this be inconvenient for some reason – it is adjustable in the range of 0-1800 mV by just one resistor change. The test tone is available from me via email in the form of WAV or AIFF or FLAC or MP3 file.

Generally - we prefer the sound of the DAC with high output levels, and most amps don't have any problem with that. A simple potentiometer or stepped attenuator takes care of that. Only solid state chip based preamps will saturate and distort that's why we need to know in advance about such solid state chip volume system being driven by the DAC. We will keep then the volume level at the “book” level of 2 V pp. Having said that - chip volume systems and preamps with opamps belong in home theatre (cheap one) and DEFINITELY not in high end.

LampizatOr DAC should not be used with opamp based preamp, no matter how good. Because the op-amp feedback loops will remove the whole joy of music as delivered by the tubed DHT DAC.
The heat issue

Many people are concerned about the heat inside the player.

We want you to relax about it - that this is NOT an issue. The DAC operates well below half of its maximum allowed temperature. Tubes are DESIGNED to be hot, this is their very nature. That's why they have internal heaters and when they are not at optimal operating temperature – they sound bad.

The other components are guaranteed up to 105C and we are expecting no more than 45 degrees Celsius in the air inside the DAC.

Our only advice is do not heat the box additionally by placing it - for example - on top of a hot class A amplifier. Give it some space around to allow free air flow and adequate cooling. Do not cover it with blankets or mats.

Optimal placement

Apart from the heat issue as described above, the DAC has no special placement requirements. Just remember to keep the S/PDIF cable not longer than 1.5 m (5 feet) and RCA chinch cables – not longer than that either. USB cables should not exceed 2m and MUST NOT have ferrite filters on them.

Since tubes are microphonic, they hate vibrations. Therefore it is forbidden to place the dac on top of the speakers or a sub. Choose least vibrating location, preferably behind the plane of the speakers.

Power on-off cycle

The tube lifetime, almost like the life of a car engine in cold climate – is determined largely by the on-off cycle. The heat expansion coefficient of the glass is so much different than that of the metal, that the air-tight seal of the metal pins can leak oxygen inside the tube and eventually kill it. Even if it is just “one molecule” per day. So in other words it is better to keep the DAC always on, than to switch it on and off more than necessary. Normally people switch off the dac only for the night.

The lampizator DAC with tube rectifier has a slow start feature which brings the high voltage supply gradually up, at the rate of two- to five volts per second. The PSU reaches 250 V DC after 90 seconds. This helps to extend tube life. The DAC is also equipped with voltage down feature (bleeders) which reduce the power voltage upon switch-off at roughly the same rate.

On top of that – the tubes are operated always around 25% of full nominal power, which greatly increases their life expectancy. Combining all the factors together, the tube lifetime should be anywhere between 10 and 20 years, assuming the player is switched off only once per day, for the night.
Additionally all our DACs have special heater circuits that slow down the inrush current by the factor of 10 and protect the heaters (cathodes) from developing spots and blemishes that cause metal erosion and eventually death (of the tube). Our circuit goes way beyond the tube datasheet recommended protection. It extends the tube life at least double versus the datasheet specs.

**Cabling and cable handling**

Just to be sure that we know what we are doing:

- AC cable can be freely plugged and unplugged during operation. It is OK for the DAC but NOT OK for the amplifier and speakers. A loud thump may appear after switch off. Please turn your volume fully down before switching off the DAC.

- SPDIF cable should be plugged and unplugged when the transport is powered off. The DAC can be on. However doing it on „hot“ when all is working – is not dangerous for the DAC as long as the AC power supply has the GND for all products (DAC, transport, amps).

- Signal cables can be plugged / unplugged with the amplifier volume turned fully down.

Please use a decent AC cable. We suggest spending around 200-400 Euro for a good AC cable, not more but not much less. The free AC “computer grade” cables are not good enough for serious audio.

Please use a decent digital interconnect. In our DAC it is completely unimportant what is the wave characteristic impedance of the cable (the famous 75 Ohms). Just use the cable that sounds good to you. Analog as well as digital interconnects can be tried. Best results are obtained with silver cables. Let your ears decide, not specs of the cable.

Lampizators produces all types of cables for audio systems - you can order them from us with confidence of tremendous value for money. To beat our cables you need to spend 2000 Euro per one.
Rectifier Rolling

Rectifiers are generally less rolled but many customers report that huge leaps in synergy can be achieved when, after choosing the optimal music tubes, we also choose optimal rectifier.

Directly heated diodes are older in design, physically larger, and have 4 pins versus 5 and use 5V heaters versus 6.3. PINOUT: 2-8 is heater 5,0 V AC. Pin 8 (or 2) is also cathode. Pins 4 and 6 are two anodes. Other pins - even if existing - are not connected. To test - just use a meter and check resistance in ohms between the pins. IN A RECTIFIER THE ONLY TWO PINS WHICH SHOW ANY OHM READING AT ALL, ARE HEATER PINS. THE READING SHOULD BE IN SINGLE OHMS like 2Ohm.

Some people report back that the directly heated diodes sound better than their indirectly heated counterparts, but this hasn't been verified in any semi scientific way. Generally we expect the directly heated diodes to have up to 400% higher current capability as well as voltage max. It all depends on the DEMAND of our circuit.

Rectifiers compatible: 274B, 5c3s, 5Y3, 5r4, 5U4G, GZ34, 5c4s, 5u4c
Rectifiers can be changed safely during playback. Just grab them by the base.
To change music tubes you must switch off the amp. DAC can continue to work. The rectifier can be changed safely DURING LISTENING without even turning down the volume.

**Aging problems**

As already explained above, the DAC should age very very slowly.

The digital PCB should last a lifetime. The transformer, the copper caps, the cables, plugs, sockets – should last a lifetime. There are only 4 electrolyte caps which we selected from premium brands and they should last circa 25-30 years. Other than that we suggest to change tubes every 10 -20 years.

So - short of a thunderstrike – we expect no failures or ageing problems before 20-30 years.

**Fuse Change**

The DAC is equipped with a non-repairable 20 mm glass fuse circuit breaker inside the IEC-AC socket at the back. There is also one spare fuse provided in the little drawer removable when changing the fuse. The fuses are 1,6A (or 2A for USA/Japan/Taiwan) they are slow blow, and overrated by the factor of 3. Therefore it is impossible for the fuse to blow without a specific reason - a failure inside the player. Consequently, if the fuse burns, it is a signal to send the dac for service and NOT change the fuse.

Obviously the second fuse will burn as well.

WE ABSOLUTELY DO NOT ALLOW changing the fuses for any larger size than 1,6A or installing the “audiophile silver bolts” in place of the fuse. Fuses are there mainly to SAVE YOUR LIFE. And we mean that. You can experiment with audiophile grade fuses but not DEAD BOLTS please.
COOPERATION WITH THE PREAMP

The load presented by the preamp or amp or simply the next analog component that the DAC sees, should be as high as possible. It is measured in kilo-Ohms and 100Kilo Ohms is a perfect ballpark value. More is VERY rarely seen. 47 K is next common value, and it is great too. 20 K is kind of on a low side, but we can handle that. Lower than 10k is bad news.

The DAC will not be damaged in any way, but at around 10K of load the dynamics of the dac will start to fade away.

Having said that - every properly designed amp or preamp keeps the load value above 40k. And if it doesn’t - we simply don’t choose such amp because it was not designed with audiophiles in mind.

DIGITAL INPUTS

There are three data types that our DAC can read internally: biphase, i2s and USB. The bi-phase can come in many forms, but the most common are:

- **S/PDIF (Sony/Philips data interface)** by means of single ended square wave of amplitude around 0,5 V pp
- **AES/EBU** - the same as S/PDIF but the signal is a mirrored (balanced) pair of square waves around 2,5 V pp (max. 5 V pp)
- **TOSLINK** - a fiber optic transmission of S/PDIF producing at the DAC the 5 V TTL electrical signal.

**The TOSLINK connection**

Is toslink bad or not? That is the question. Like everything in life - it can be bad or it can be good.

By using own experiments and oscilloscope observations we concluded, that Toslink is not bad and not inferior to RCA SPdif if implemented properly. Toslink is EXTREMELY demanding about the power supply quality. That’s why we build for toslink separate dedicated power supply and with this supply the response is instantaneous and there is no deformation of square wave. Usually Toslink ports are installed in cheap low end gear and the power supply to Toslink is completely neglected. Not in LampizatOr DAC. If you have Toslink in your DAC you can be sure it will sound good and not degrade the sound. Of course providing that the transmitter part of the link is at least semi decent.

NOTE: All Apple products which have headphone output (iMac, MacBook, Power MAC, MACMini, iPhone, iPad, iPod) - have a secret toslink transmitter hidden inside that port. Just buy the special cable - Toslink Minijack and when placed in the headphone output of an Apple product - will emit light with SPDIF in it. That is a very good way of using MAC computers as transports.
USB playback

USB data requires installation of additional converter module to convert the “packet” data into a steady i2S stream. Our asynchronous converter has internal RAM and two own clocks and own power supply and own power transformer secondary winding.

The USB module requires a driver for Windows to recognize it. MAC OS and LINUX work without any need for extra drivers.

We use Amanero as vendor of USB modules:

the driver is at www.amanero.com/drivers

Do not install windows driver with the DAC USB connected to PC.

Our USB converter is capable of working with 32 bit files with 384kHz signal frequency. Only USB2 rated cables will work. The USB standard printer cable will not work.

USB cables with ferrite filters (the “thingie” on the cable ) will not work.

We recommend ROON as the best playback software, followed by JRiver, Foobar2000, Audirvana 3

We stopped supporting HQplayer and iTunes in 2017.

The operating systems can be Linux (best) MAC-OS (any version) or Windows (any version).
MAC OS operation of USB output:

MAC OS does not require any driver installation. Somehow miraculously the MAC computer knows how to handle all USB devices. Microsoft, even 15 years later, still can’t figure out how to do it. They are probably still scratching their heads.

After plugging the DAC by the USB cable and turning it on, within 3 seconds the device should show up on the MAC.

Note: the device will NOT be described as Lampizator DAC but as Amanero Combo module.

To verify what is going on, please go to the “apple sign” in top left corner of the screen and choose PREFERENCES and then the loudspeaker icon - SOUND.
Above: on that list the Amanero should appear under INTERNAL SPEAKERS.

Next thing to check is MIDI SETTINGS of the MAC computer. We go to the top right corner of the screen and press SPOTLIGHT (Loupe):

We type in the search line MIDI SETUP and -> enter.

In the MIDI setup we can choose frequencies of sampling we use for the Amanero output. We don’t think that the higher the better but your own test should confirm that.
Audirvana Screenshots of working MAC OS configuration:
General Optimization

- Deactivate completely iTunes own playback
  Note: this option should be enabled for playing proxy files

Sound Quality optimizations at the expense of convenience functions

- Deactivate volume control by iTunes
- Deactivate play position control by iTunes

Note that changes will be effective only upon next playback start.
JRiver DSD setting screenshots
SysOptimizer optimizes OSX for Audio Playback by deactivating non-essential services that can cause interferences detrimental to sound quality.

- Optimize System for Audio Playback
  - Audirvana Plus priority: Very High
- Disable Spotlight
- Disable Time Machine
- Disable detection of iDevices on USB

Selected services are deactivated upon playback start, and restored after stop.

Preferred Audio Device
- Combo384 Amanero

Active Audio Device
- Built-in Output
  - 44.1 48 88.2 96 176.4 192 DSD64 DSD128
- Stereo
  - Native DSD Capability: DSD over PCM standard 1.0

Low level playback options
- Exclusive access mode
- Direct Mode
- Integer mode (if avail. on device)

Maximum memory allocated for tracks pre-load
- 896 MB
  - 22mn @44.1kHz
  - 10mn @96kHz

For bridge devices connected to a DAC
- Max sample rate limit: No Limit
- SPl rate switching latency: None
- Limit max bitdepth to 24bit instead of 32bit
Sample Rate Conversion

Converter: iZotope 94-bit SRC

Quality
Fastest

Advanced parameters
Steepness: 97 dB
Filter max length: 500,000 Samples
Cutoff freq.: 1,000 x Nyquist
Anti-aliasing: 175.0
Pre-ringing: Min. Phase 1.00

Forced Upsampling: None
- Power of 2 oversampling only (2x, 4x, ...)
- Maximum sample rate upsampling
- Oversampling 2x only
- Custom

Audio Signal Polarity
- Invert globally
- Invert for tracks with INVERTPOLARITY comment

Some CPUs may not be able to perform sample rate conversion at best quality settings fast enough for realtime playback. This could result in pauses in playback. Note that changes will be effective only upon next playback start.
Block Diagram - DAC without Remote Control

SOME Q & A

1. Why BEST300B?
This DAC is made especially for BEST300B.COM tube store

2. Why DHT?
The decision of using directly heated triodes comes from three main decisive factors - the sound quality - the whole DIY community reports that this is the best sounding tube they can find and third - that directly heated IS THE WAY TO GO for highest level of DACs.
3. Why R2R conversion?

From 2014 we observe that the top 5 DAC companies in the world use R2R discrete ladders as their top solutions. These solutions go up to 100 000 Dollars for a DAC or even more. Therefore we co-developed our own R2R solution and we offered it in our Golden Gate DAC. BEST300B project is about bringing this superb and superior converter type DOWN IN PRICE POINT to be accessible by the majority of audiophiles.

4. Why Copper capacitors?

Since there are only 3 components in total in our signal path - it is important to use these 3 parts from the highest quality group. the output capacitor is one of the three so we wanted to use the best available at any price. So here it is - our Lampizator house branded copper cap which matches the 4 known copper brands in quality of sound.

5. Why do you claim this to be one of the best DACs ever?

Well, the above explanations sum up to the statement - that the BEST300B is the only known DAC that combines R2R discrete ladder conversion, Directly Heated triode tube output, copper capacitors (with real Cu foil versus the metal vaporised plastic) and last but not least 10 years of Lampizator’s expertise in DAC design and technology. Add to it the DSD capability and excellent test / purchase / warranty /policy and you get as a package one of the best DAC in the world.
I PLUGGED EVERYTHING BUT I GET NO SOUND

Quick check list:

Is the voltage at the back switch selected to your country?

Is AC power switch at the back thrown to ON and red lamp illuminated?

Is ring on the front illuminated?

Are tubes warm to touch after min. 1 minute? Glowing in the darkness?

Is the ring button pressed in (meaning USB input engaged in the DACs)

Is the ring button OUT - meaning SPDIF input engaged

In DACs with more than one SPDIF input (also Toslink, BNC, AESEBU) is the rear panel’s toggle switch pointing towards the right input?

Are analog RCA cables leading to the amp connected?

Is Amplifier powered, connected, input selected correctly, un-muted, with speakers connected?

If you use a computer with USB connection - is the driver recognized? Is Windows driver installed (Amanero Combo384?)

Is the computer’s output device properly defined to be AMANERO COMBO and not speakers, SPDIF, Toslink or Intel?

Is the computer’s digital volume control set to maximum?

Is the USB cable not of USB1.0 type, not longer than 2 m and not with ferrite rings on it?