

the horizon

LampizatOr DAC – User Manual



WARNING: as every DAC comes with a 7 days testing period (please to confirm it - ask your dealer first), during this time it is not allowed to open the DAC. The screws are protected with a seal. You have to decide, if you like the sound and you want to keep it. After the 7 days period expire – your DAC is a keeper, and you may open the hood. This does not invalidate the warranty, however – any modifications – no matter how small – invalidate the 5 years warranty. Changes, upgrades and mods must be pre-authorized in writing, even tube change. DACS returned during the test period with the seal broken will not be refunded and will be sent back.

THE SHORT MANUAL

1. Plug in the mains, digital source input and analog (amplifier) output cables.
2. Switch the red rocker switch near the AC inlet at the back side
3. Press the middle button on the front panel for 3 seconds until click of the relays confirms the power
4. Observe the Nixie display come alive 5 sec later
5. Watch calmly the countdown of 30 s warm-up period
6. The DAC is ready to play.

Enjoy !

From the designer:

I am so extremely happy to introduce to you my brainchild - the Horizon.

Thanks to a revolutionary chip technology, like nothing we ever saw before - it was possible to design a DAC that creates a class of it's own. Never in the twelve years since LampizatOr's founding have we taken on such an ambitious, expensive and labor intensive project.

From custom transformers, custom 4 layer PCB, 17 separate power circuits, ultra high end music conversion topology, customized muting solutions, proprietary firmware and software, the chip that revolutionizes the industry, new tube scheme, new tube selection, TRP (tube rolling paradise setup), new chassis, new heating scheme, new superb volume control with bypass feature, new uber cool nixie display, elimination of knobs, elimination of LCD and OLED displays, new USB solution with super-clocking, antivibration CNC milled support for all PCBs, elimination of visible screws - everything about this DAC is new, rethought and redesigned.

The resulting DAC is a true flagship. We can say with full confidence that you are getting a unique masterpiece of craftsmanship that will redefine what you believed possible and may never be surpassed.

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The description of REMOTE CONTROL unit

functions for “Kallas” systems as used in the PACIFIC DAC.

Our remote control is made of metal and is custom made for our volume control system. The batteries are of “coin” type and do not live too long, it is advisable to keep a fresh unopened battery type CR2032 in your storage, we think the batteries need to be changed once per year.

Batteries are accessible after un-screwing the bottom of the remote unit.

ON powers up/down the whole DAC but the Remote Control processing circuit remains powered even after switch off . If you switch off by the rear power button - it also powers down the remote circuit therefore it will be impossible to switch the DAC on via remote.

VOL+ VOL- changes the volume from complete MUTE (-63 dB) to complete bypass - 0 dB in 64 smooth steps.

On the Horizon’s Nixie display - the 00 represent muting, 01 is minus 63 dB sound and 62 is the loudest volume setting. One step up - 63 means full gain, volume bypass mode. The absolute volume level depends on the tube choice and may vary from model to model.

Input - and Input +- changes the analog and digital inputs to the tube section.

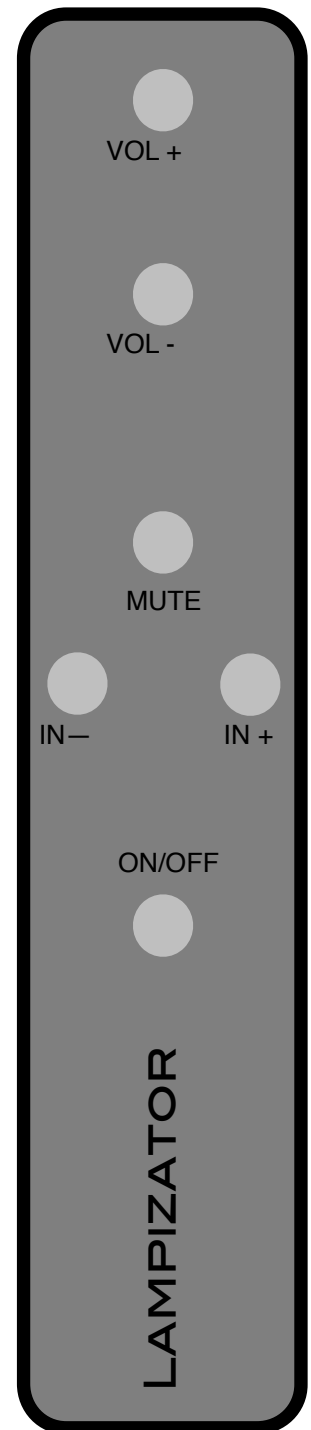
1 = SPDIF, 2 = AESEBU, 3 = Toslink, 4 = USB, 5 = HDMI i2S, 6 = RJ45 i2S, 7 = Analog RCA input, 8 = analog XLR balanced input

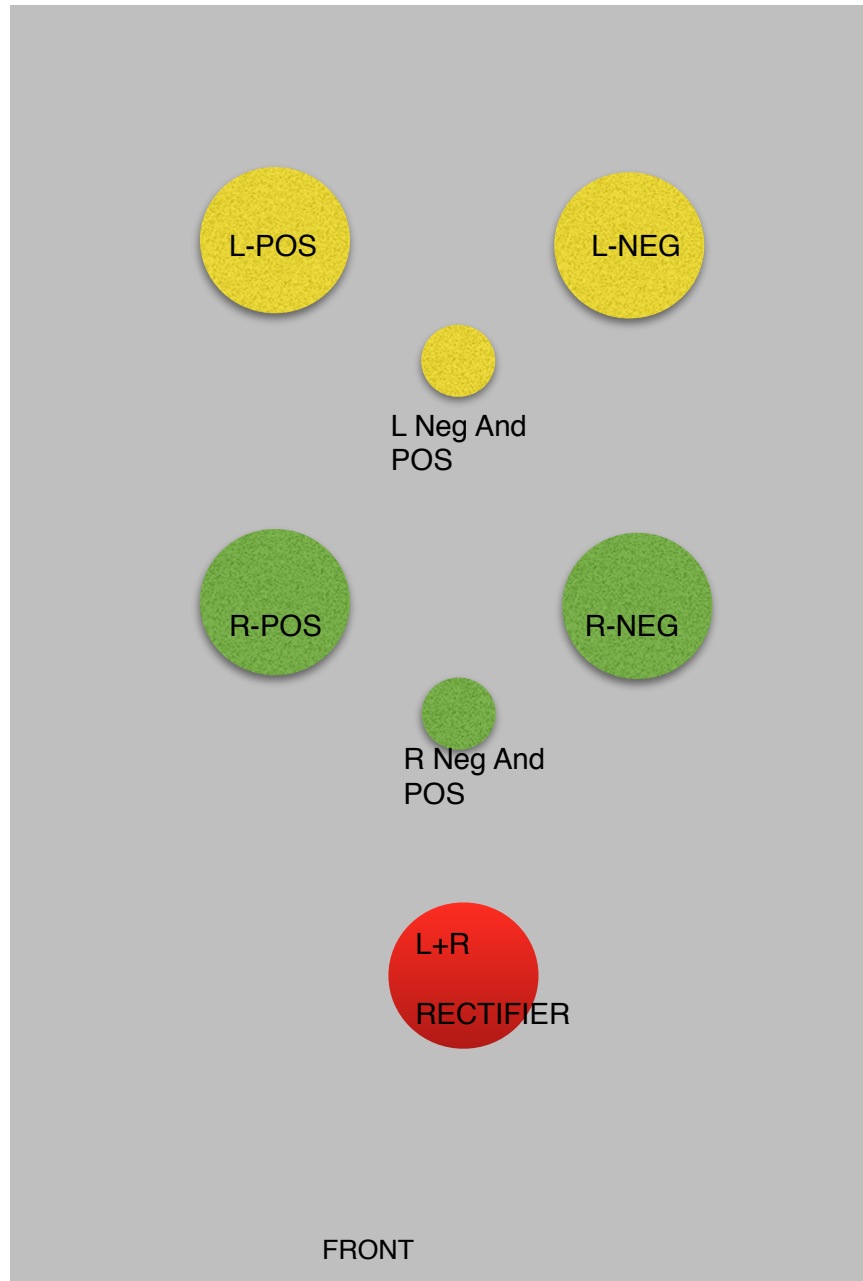
MUTE does just that - mute. After pressing again - the DAC will go back to the last volume used. Touching the Vol-Up and Vol Down functions will un-mute automatically.

The volume levels (last used) are remembered.

The DAC by default will start on USB (number 4) input.

Changing the input will switch the display for 3 seconds to the input mode, and then it will jump back to showing the volume.





Tube positioning

Left channel - positive phase, Right channel positive phase, Left channel - negative phase, Right channel negative phase, are the power pentode tubes (must all four be equal and the same). The basic tube there is EL34 or KT88

Small 6SN7GT is a dual triode and works for two phases of one channel as DAC conversion input.

A quick guide to a smooth start

THE BUTTONS

The whole DAC can be operated simply by the three buttons on the front.

Left and right button are simply VOLUME UP and DOWN.

When you hold the button the volume change will accelerate to the end of the scale.

Middle button is a POWER ON while DAC is in STANDBY mode and it is input selector when the DAC is in the operation.

The Nixie display will show the selected input number for 3 seconds. After that it will jump back to showing the volume level.

1 = SPDIF, 2 = AES/EBU, 3 = Toslink, 4 = USB, 5 = HDMI i2S, 6 = RJ45 i2S, 7 = Analog RCA input, 8 = analog XLR balanced input

MAINS 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 switch at the bottom, allowing user to select mains voltage.

It requires placing the DAC on the side and sliding the 115/230 switch to the opposite position, firmly to the end of slide.

POWER CABLE (MAINS)

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 don't supply any AC cable at all.

Introduction

Thank you for choosing Lampizator HORIZON 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.

The DAC should be future-proof. Shall we ever launch a major upgrade to the digital part – you can get the upgrade at very reasonable cost. Shall you decide you need some added features – you can also get them at reasonable cost anytime in the 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 than 24 bits. We already hit the human ear limits, not to mention the real needs of mass consumers. It is good to know that we out perform the music industry file resolution by the factor of 4 (400%).

Horizon design

This DAC is like no other, mainly due to the fact it is using dual triodes as DAC output converters to voltage and power pentodes as triode loads, triode buffers and voltage stabilisers at the same time. The power pentodes seem to be much too large and much too expensive to be used as “small signal” tubes. That's why the decision to use them is so beautifully radical and extreme, worthy of high end status.

Big power pentodes like EL34, KT66, KT88, KT120, 150 and 170 are ridiculously overspecified for the job in this circuit but that's the key to this big, bold, effortless sound that no one else can match, they offer in return a sound signature that is simply craved by high end audiophiles and music aficionados around the world. The sound becomes effortless, powerful but delicate, smooth but detailed, well controlled but musical, three-dimensional and gorgeous at the same time. This is partly due to the fact that the radiation and absorption areas of these triodes are tens of times larger than those found in small tubes, making electron density much smaller and the flow is much easier. This for some reason sounds better.

The Heaters of our DAC are AC type, precisely controlled and safely limited in both voltage and current. Our heater circuits provide good protection for long life of these tubes..

The Anode High Voltage is supplied with our proprietary tube power supply, consisting of a very high grade toroidal transformer, one EI-transformer, Dual Diode directly heated rectifier, a choke and capacitor filter and passive filtration and energy storage stages. After the rectifier diode tube - the supplies split into dual mono. (in fact into quad-mono considering the two phases per channel)

Balanced Operation is possible because we employ a fully balanced digital engine that produces 4 analog outputs simultaneously:

Left Negative, Left Positive, Right Positive and Right Negative.

All four outputs are treated equally, get their individual volume control ladder, individual filtering, signal shaping, and amplification by one tube each. That's why we have 4 triodes per DAC and additional 4 big pentodes for Anode Loading.

Triode, pentode and Rectifier swapping (rolling) is described elsewhere in the manual.

Data formats

The DAC is capable of automatic recognition of all sampling rates from 32 to 768 kHz and bit rates from 14 to 32. Since few if any transports offering S/PDIF 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 S/PDIF 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 via S/Pdif. USB is made for that.

If you use USB connection, all our DACs will play up to 768 kHz 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, 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 the master recordings are made in record industry.

In Horizon DAC - we use AUTOSENSING and automatic switch from DSD to PCM and back. User doesn't need to do anything, just enjoy.

Our DAC will automatically recognize and switch all DSD speed rates from normal 64 SACD format to 2x (128x) and quad 256x format or 512x shall you need it.

Audio volume level

Tube technology allows us to set practically unlimited volume level at the output, up to 3 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. Balanced signal is double that.

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 in the

amp's input stage takes care of that. Only solid state chip based preamps will saturate and distort.

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 DAC. The horizon is simply speaking way too good for that.

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.

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 one foot 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.

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 275 V DC after 60 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 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. Our circuit goes way beyond the tube datasheet recommended protection. It extends the tube life at least double to tenfold 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 use standby off before switching off the DAC from power cable.
- S/PDIF 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).
- RCA Signal cables can be plugged / unplugged with the amplifier volume turned fully down. XLR cables can be unplugged and plugged at any time because it is in their professional nature to do so.

Please use a decent AC cable. We suggest spending around 100-500 Euro for a good AC cable, not much 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 is the wave characteristic impedance of the cable (as well as digital cables. Let you

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Tube rolling and replacement

We took an expensive and painful decision to sell the DAC with the best tubes we can find in consistent sustainable supply. Therefore we feel you should not be tempted to change them for any reason. If you feel that you must try tubes other than supplied, please follow the guidelines below.

Generally, among our tubes the level of significance for the sound quality is: Rectifier 10%, Small dual trioded 6SN7 = 40%, pentodes 20% , synergy between pentodes and dual triodes = 30%.

The sign that the tube needs changing is that there is no sound and/or the tube is cold and doesn't glow red filaments in the dark,

White powder inside the glass means oxygen inside = dead tube.

Tube ADAPTERS

The pentodes and rectifier generally don't need adapter.

We can find adapters straight to Octal, like 12AU7->6SN7, or double adapters like for more rare tube - ECC182 - we need following adapter: first 5687 to 12AU7 and that goes into 12AU7 to 6SN7 Octal.



Here are some GENERAL practical tips for tube rolling:

1. Tube compatibility- many people ask “is the tube X compatible with Y?” and the answer is of course - it depends. Tubes can have completely different bases but be compatible by parameters and can be swapped by means of an adaptor. A good example are ECC40, and 6SN7GT - different bases but very close parameters. Or ECC88 and 6DJ8. Or 6H8C and 6N1P.
2. Other scenario is when the tubes have same base (say - noval) but they have different pinouts. So we CAN NOT inter-change the two tube types but we CAN use an adaptor. Same base type and same pinout DOES NOT MEAN that the tubes are interchangeable - best example is cc81 and cc82 - same base, same exact pinout but completely different parameters. Or octal 6SN7 and VT99 - both octal, same parameters, different pinout.
3. Some tubes can have same base, same pinout and same parameters except the different heaters. Best example is ECC82 and 12BH7 - the former uses half heating of the latter. They can be used with a switch or within limited timing or with extra care, depending on the heater arrangement in our DAC. Another example are completely different tubes that miraculously are perfectly interchangeable - like E182CC with 5687.
4. Pentodes used in our Horizon DAC are yet another can of worms. Most Pentode tubes have the same base (Octal) and the same pinout (Heaters on 2 and 7, anode at 3, cathode at 8) The problem is that these tubes have completely different heater demands. Our DAC is designed to accept ALL KNOWN pentodes from this group. People keep discovering more and more compatible types every month.

We supply the tubes that are purchased new from reliable sources. They are tested and matched.

WE DO NOT DEAL WITH NOS TUBES, leaving this fun entirely to YOU.

Table 1

Tubes for the Horizon - input conversion - TWO tubes (dual triodes)	SOCKET / adapter NAME	5687	6922	12AU7	VT99
		E182CC	6922	12AU7	VT99
		ECC182	6DJ8	ECC82	6F8G
The name of the Horizon default socket is OCTAL and the pinout is 6SN7.		7119	Ecc88	ECC802	
		5687	E88CC	12BH7	
		6900	6N1P	ECC99	
			6H1(pi)	ECC81	
			6N23P	ECC180	
			6N6P	12AT7	
			6H6(pi)		
			6N30P		
			6H30(pi)		
WITHOUT ADAPTER fits:	6SN7GT	VT-231	6H8C	6N8S	CV181
Two dual triodes are needed.					
Output buffer pentodes (no adapter)	6L6	EL34	6CA7	KT77	6550
	6V6	KT66	KT88	KT90	5881
	KT120	KT150	KT170		
	With adapter	EL84			
Rectifiers - no adapters needed	5r4WGA	5Y3	5C3S	274B	5U4G
	GZ480	GZ34	GZ37		

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 dual diodes are older in design, physically larger, and have 4 pins versus 5 and use 5V heaters versus 6,3 compared to Indirectly heater rectifiers.

PINOUT: 2-8 is heater 5,0 V AC. Pin 8 (or 2) is also cathode. Pins 4 and 6 are two anodes. 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 2 Ohm.

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 al depends on the DEMAND of our circuit. Some Lampizator tube stages demand only 2 mA in total, some can demand 40mA and more. Horizon DAC demand in total for 2 channels is 80 mA.

Rectifiers compatible: 274B, 5c3s, 5Y3, 5r4, 5U4G, GZ34, 5c4s, 5u4c

To change music tubes you must switch off the amp. DAC can continue to work.

Aging problems

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

The digital PCB should last a lifetime. The transformer, the paper in oil caps, the cables, plugs, sockets – should last a lifetime. There are 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 years.

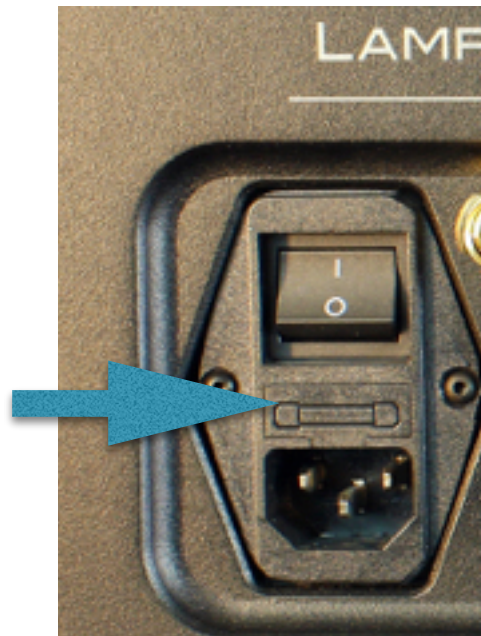
So - short of a thunderstrike – we expect no failures or ageing problems before 20 years.

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 2A (or 3,15A for USA/Japan/Taiwan) they are slow blow, and overrated by the factor of 2. 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 2A (3,15) 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.

Spare fuse is here



Volume control

The volume control is an extremely nice module, that changes the way we use the DAC. The module consists of 5 elements:

1. Power supply with the DAC power management relay, allowing to switch ON/OFF the whole DAC via the remote while keeping the volume module powered.
2. The display - nixie pair which is our GUI.
3. The microprocessor board with memory, firmware and the chip that controls the relays
4. Two dual Relay volume boards with resistor ladders. The microprocessor connects the resistors in such way that they form a resistive attenuation L-Pad with 63 steps of logarithmic attenuation. The overall impedance is held at almost constant 30k and the steps are calibrated in 1 db distances. The accuracy is less than 1%
5. The virtual potentiometer with push action called the encoder.

The module is capable not only of volume adjustment but also of the input selection- both analog inputs as well as digital.

Using the volume module: Press the volume button down for 3 few seconds and the display will show you the current volume and will start changing .

The input selection is available from the remote in direct mode - just press the remote INPUT to choose input or use left - right panel buttons.

MUTE function: this is useful to use instead of turning the volume all the way down. Available ONLY via remote.

POWER OFF - the DAC will be switched off fully but the remote module will be always alive to enable you to power it ON again.

0dB operation: at full volume - 0dB the DAC operates as if there was no volume module. This position is recommended for systems with own volume control: preamp or integrated amp. The resistor ladder is completely by-passed.



COOPERATION WITH THE PREAMP

The DAC with volume control should sound audibly cleaner and more direct without any preamp between the DAC and the amp. The preamp, however good, will veil a lot of the DAC's natural clarity, speed and directness. If you feel you need the preamp nevertheless, use DAC at the full volume with bypass (63 on the display).

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 bass extension may suffer a few hertz of the lowest octave

The DAC will not be damaged in any way, but at around 6K 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 inter face) 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)

TTL - just as S/PDIF but 5 V pp

TOSLINK - a fiber optic transmission of S/PDIF producing at the DAC the 5 V TTL electrical signal.

RS422 - it is practically the same as AES/EBU

The i2S is the same as biphase but separated into 4 signals - each carrying only one type of information. Biphase encodes 4 groups of informations in one signal stream. Specifically they are: System Clock, Bit Clock, Left/Right Clock and Data. We can install these four in any type of connector, because there is no standard. Most customers use HDMI, or RJ45 LAN socket or simply four RCA sockets just like in TV RGB.

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.

on HDMI

It is important to understand, that HDMI is a special digital connection standard for mainly TV and Video applications and what is used in audio world IS NOT REAL HDMI, We only use a convenient plug, socket and cable from HDMI but the information transmission is completely different and it is called i2S

Our i2S can be balanced or single ended (data transmission, not audio system) and it can be high level (5V pp) or low lever 0,5 V pp. In addition, pinouts differe between manufacturers of transports.

USB playback

USB data uses an internal 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. It has optoisolation between the computer and the DAC section, it has two separate own transformer windings and two separate PSU units on floating grounds.

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



To download the Windows driver go to www.jlsounds.com and the drivers are there:

<http://www.jlsounds.com/drivers.html>

Our USB converter is capable of working with 32 bit files with 768 kHz signal frequency.

Only USB2 rated cables will work. The USB standard printer cable will not work optimally.

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

From JL website:

“Asynchronous USB to I2S interface

I2SoverUSB v.III board is especially designed for asynchronous audio transfer. It can transmit PCM and both DSD512 native and DSD256 DoP audio data. This board provides bit-perfect playback at sampling rates from 44.1 kHz up to 768 kHz with up to 32 bit resolution.

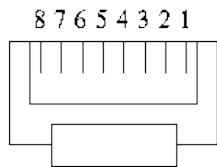
i2SoverUSB v.III uses reclock to reduce jitter significantly. I2S, S/PDIF outputs, oscillators and reclock are galvanically isolated from XMOS processor and USB ground. The galvanic isolation eliminates common noise originated by the computer. There is an galvanically isolated external master clock input. The board is equipped with NDK NZ2520SDA ultra low phase noise oscillator 45.158MHz and 49.152MHz. LP5900 ultra-low noise linear voltage regulators are used. “

i2S PINOUT

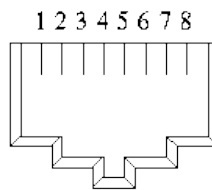
I2S Pinouts

The JK12S uses a RJ45 connector to output I2S signals according to the following pin outs:

1	SLCK
2	SLCK GND
3	SDATA
4	SDATA GND
5	L/RCLK
6	L/RCLK GND
7	MCLK
8	MCLK GND



*Figure 1:
End view of RJ45 Plug*



*Figure 2:
Looking into an RJ45 Jack*

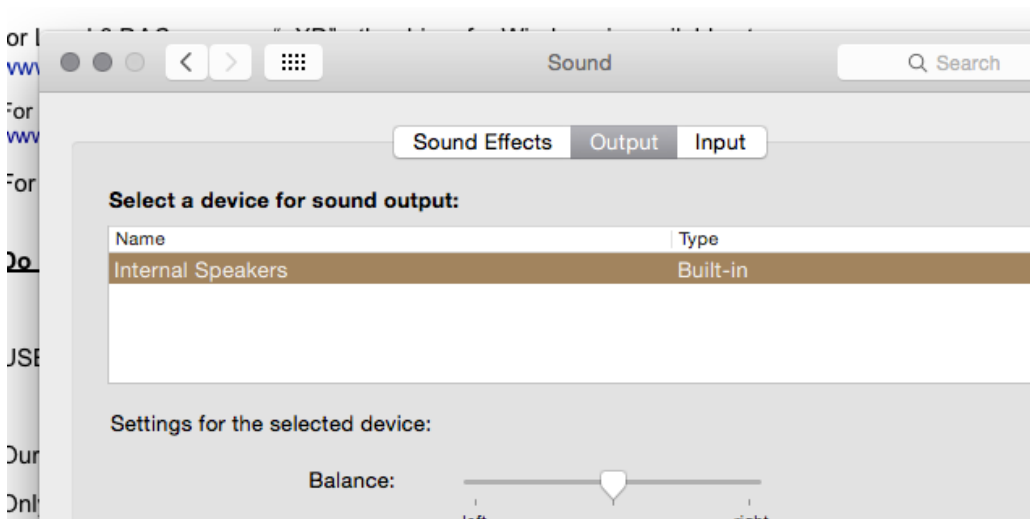
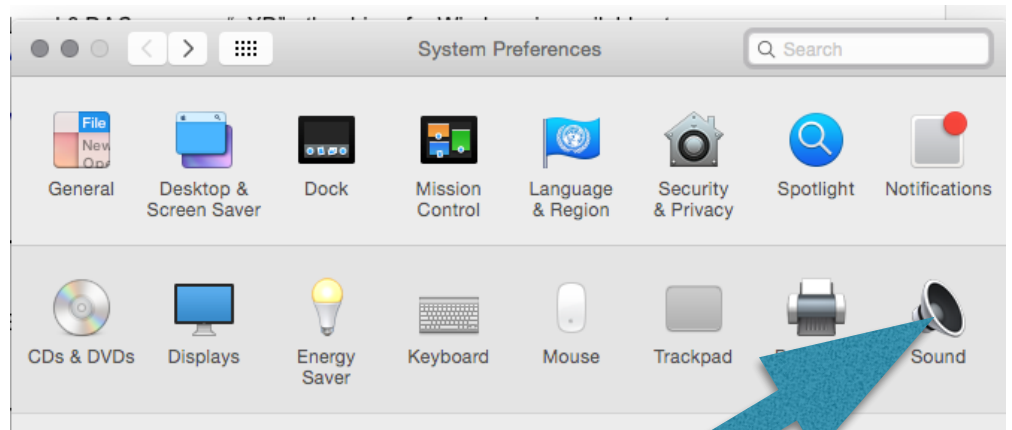
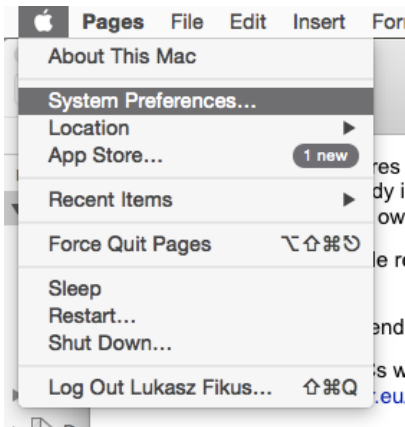
MAC OS operation of USB output:

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.

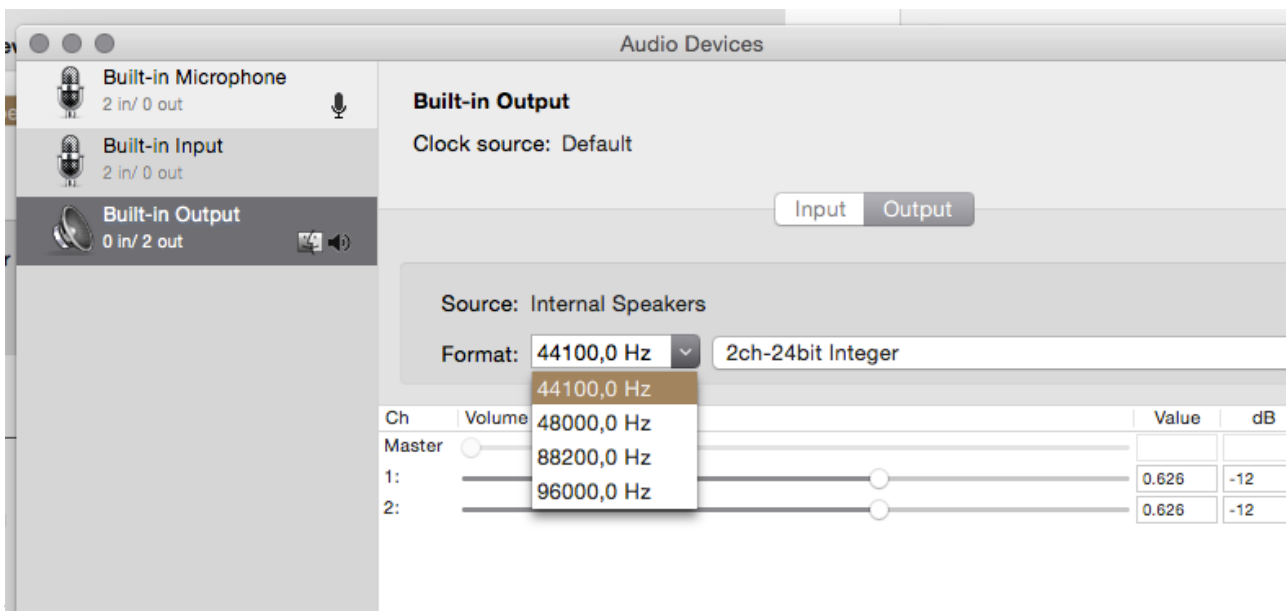
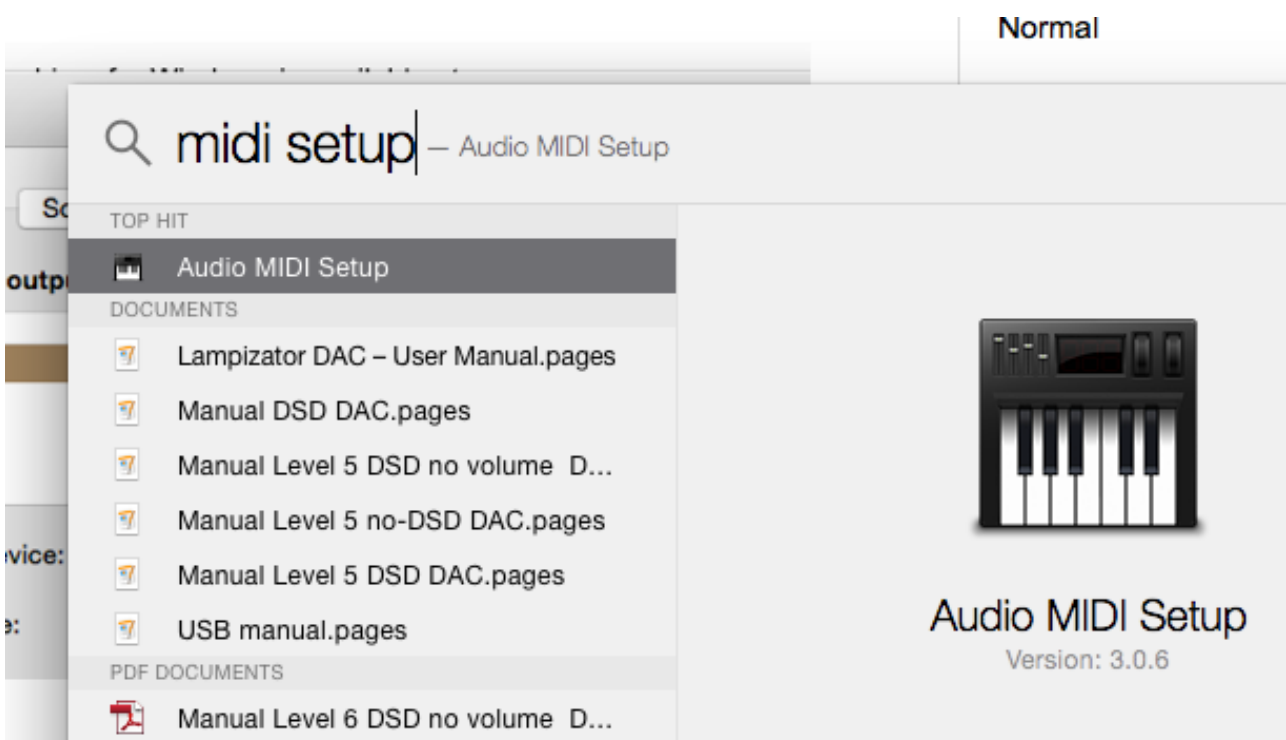


Above: on that list the USB LAMPIZATOR should appear under INTERNAL SPEAKERS.

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.



LISTENING TO THE MUSIC

some practical tips

Please use good shelf for the DAC. Do not place it on speakers, subs, or even on transports or amps. Again - tubes hate vibrations.

If you try the special devices for placement, we feel that: granite or marble is bad (ringing). Cones are just plain ridiculous and stupid. Cones are for uneducated people. Ceramic ball bearing feet are great. Good wood is great if thick. Others - please try.

The way stereo sound is created inside the DAC can - under optimal condition - re-create the musical experience as it sounded live. It means that two speakers can cause us listeners to hear sounds everywhere around us, above, below, far in front, almost close to our face, and also behind us. This type of imaging is our goal. The sound must be able to get detached from the speakers (so called disappearing act) and the more our DAC helps doing it - the higher we value it (and price accordingly). We voice our DACs to be as 3-D as possible with the beginning of that 3D as close to listener as possible.

From our experience speakers should be positioned following the basic rules of LampizatOr Nirvana Room:

1. Speakers and listener's head form unilateral triangle (3 x 60 degrees) with the distance between speakers being exactly equal to distance head-speaker.
2. Head must be in exactly middle of the speaker base and the speaker base must be exactly symmetrical versus side walls. We place speakers and measure the distance from side walls with 1 cm accuracy.
3. The distance of the speakers to the side walls and speakers to rear wall should not be equal. We recommend 1,4 times smaller or 1,4 times larger distance- but not equal. We measure that counting from the magnet of the bass driver.
4. Distance from rear wall of speaker and rear wall of the room should be no less than 0,5 m or 2 feet.
5. Ideally, the tweeter should be at the height of the ear or up to 10 cm higher, but nOT LOWER. Speakers with tweeters lower than 90 cm sound terribly wrong. In such event do everything you can to elevate the speaker by means of stands, bases or just cement block or at least lower the listening seat as much as possible.
6. The chair or sofa should not have the back support higher than the person's shoulders - in other words - should not be just behind the ears
7. Feet are the second ears of our body. They receive a lot of vibration stimulation and the brain combines this with the hearing. So we advise to have a piece of floor without any carpet directly where our feet are. Listening with feet (preferably bare)

on the hard floor greatly enhances our perception of music. It is advisable to have rug or carper between listener and speakers but not under the feet.

8. It is advisable to put something soft directly on the wall behind the speakers
9. The so called toe-in - the degree by which the speakers face the listener and not alongside the walls straight - is very critical. The rule of thumb is to toe in half way between standing straight and aiming at the listeners ear. Or slightly more straight, but not more towards the head. Over- toe-in kills the soundstage.

BURN IN PERIOD

The DAC comes straight from our factory after around 72 Hours of testing so it is not exactly “new” but it is not burned-in enough. Our customers report back, that after 3 days of constant powering (playing or not) the DAC opens up significantly. Further improvements are observed after up to 7 days when things stabilise into plateau.

Additional one day burn in is needed after every time the DAC: travels somewhere (vibrations), or is disconnected for over a month or is subject to cold temperature - like in the car trunk, when left overnight.

When the DAC is fully burned in, the sound quality is stable, and we only need to warm it after powering every day.

The DAC starts to play after 30 seconds.

The tubes reach full technical parameters and stabilise after 60 s. but that does not mean that the DAC sounds it's best yet.

The whole system reaches operating temperature plateau after circa 20 minutes and it is ready for serious listening.

ENJOY YOUR MUSIC LIKE NEVER BEFORE !

Audirvana Screenshots of working MAC OS configuration:

SOME Q & A

1. Why Horizon?

Atlantic and Pacific names were the first Naval name is to commemorate Lukasz Fikus sailing voyage across that ocean in May 2016 where he took the decision to take more focus on extreme improvements in the DACs, focusing on it during the endless sailing shifts of duty. The successor of Atlantic - was of course the Pacific. Since we run out of oceans, Horizon seemed like the next logical step.

2. Why no longer DHT ?

The decision of not using directly heated triodes comes from three main decisive factors - the fact that the more popular tubes are getting rapidly harder to get and more expensive, problems with rolling DHT with different heaters and also the listening tests made us choose the current Pentode/triode scenario. We simply wanted the best sound at any cost.

3. Why Copper capacitors?

Since there are only 4 components in total in our signal path - it is important to use these 4 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.

4. Why do you claim this to be your best DAC ever?

Well, the above explanations sum up to the statement - that the horizon is the only known DAC that combines that level of digital section sophistication with an in-Directly Heated pentode tube output, copper capacitors (with real Cu foil versus the metal vaporised plastic) and last but not least 12 years of Lampizator's expertise in DAC technology. Add to it the DSD 512 capability and excellent test / purchase / warranty / upgrade policy and you get as a package the best DAC in the world.

We MOST DEFINITELY never heard anything better anywhere!

I PLUGGED EVERYTHING BUT I GET NO SOUND

Quick check list:

Is the voltage at the under the floor switch selected to your country?

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

Is nixie display on the front illuminated ?

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

Are analog RCA cables leading to the amp connected to OUTPUT sockets, and NOT the preamp input sockets

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

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

Is the computer's output device properly defined to be Lampizator USB and not speakers, SPDIF, Toslink or Intel?

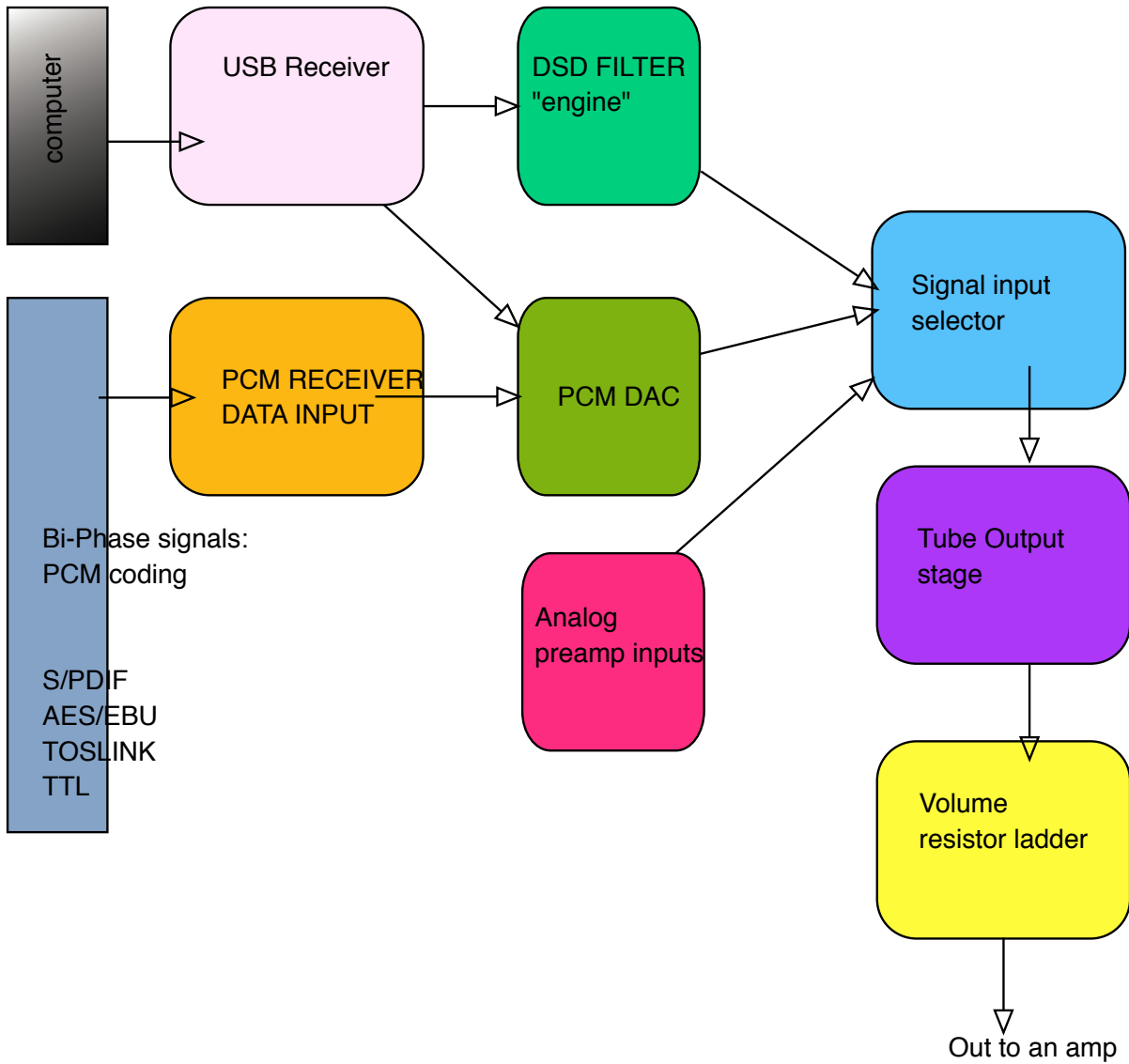
Is the computer's digital volume control set to maximum ?

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

The special footers:

There are thousands of after market footers out there and you can attach your own footers via a M5 threaded hole that we provided for that purpose under our stock footers.

Block Diagram - DAC with Remote Control



The Rear Panel (inputs and outputs)

