b-DAC instruction manual
(for software version 2.5)

Please read this manual before operating the unit

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Introduction

Thank you for purchasing the Tentlabs b-DAC. This product features a rich set of functions and embodies our company philosophy of providing the most transparent signal chain possible, enabling you to achieve the best possible sonic results.

Please take a few moments to read over this instruction manual to get the most out of your unit. The manual describes how to set up the b-DAC and provides some technical background information. Should you have any further questions or suggestions on how to improve this manual, please feel welcome to get in touch with us.

We hope this investment will bring you many years of outstanding listening enjoyment.

Important Safety Instructions

Tentlabs gaat er van uit dat u deze Engelstalige tekst volledig begrijpt. Als u hier moeite mee heeft dient u contact op te nemen met Tentlabs. Op verzoek sturen wij u een vertaling toe.

Tentlabs nimmt an, dass Sie diesen Englischen Text völlig verstehen. Wenn notwendig, nehmen Sie bitte Kontakt auf mit Tentlabs. Auf Wünsch wird Ihnen eine Übersetzung zugeschickt.

Tentlabs suppose que le lecteur comprend parfaitement le texte en Anglais ci-dessous. En cas de doute s.v.p. contacter Tentlabs. Si necessaire, on pourra vous envoyer une traduction.

Tentlabs da por supuesto que el texto en versión Inglesa no ofrece ninguna duda de in- terpretación y se entiende integramente. Si este no fuese su caso rogamos contacte con Tentlabs quien, a petición, se encargaría de enviarle la correspondiente traducción.

Please follow these precautions when using this product:

1. Read these instructions.

2. Keep these instructions.

3. Heed all warnings.

4. Follow all instructions.

5. Dangerous voltage is inside this apparatus. Opening is only allowed by qualified service personnel.

6. Verify line voltage before use.

7. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

8. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptables, and the point where they exit from the apparatus.

9. Unplug this apparatus during lightning storms or when unused for long periods of time.

10. Do not use this apparatus near water.

11. Do not use this apparatus outside.

12. Do not expose the apparatus to dripping or splashing. Do not place objects filled with liquids (flower vases, drink cans, coffee cups, etc) on the apparatus.

13. Unplug the unit from the mains supply before cleaning. The case should normally only be cleaned with a dry, soft, non-fluffy cloth. Do not spray any liquid cleaner onto the cabinet, as this may lead to dangerous shocks.

14. Install in accordance with the manufacturer's instructions.

15. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat. Avoid exposure to direct sunlight.

16. Use only attachments or accessories specified by the manufacturer.

17. Use only with a cart, stand, bracket, or table designed for use with professional audio or music equipment. In any installation, make sure that injury or damage will not result from cables pulling on the apparatus and its mounting. If a cart is used, use precaution when moving the cart/apparatus combination to avoid injury from tip-over.

18. This unit runs slightly warm when operated normally. Operate in a normal ventilated area. If this product will be installed in a rack, make certain there is sufficient air movement within the rack.

19. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

20. WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

Unpacking and Inspection

Your b-DAC was carefully packed at the factory and the carton it came in was designed to protect it from the trials and tribulations of shipping. Keep the box and all packing materials, so that in the unlikely event that you need to return the b-DAC for servicing, you can do so safely.

1. Signal connections

Wiring up

The text on the back panel should make wiring up a breeze.

From left to right:

- Unbalanced analogue outputs on RCA, top is left, bottom is right channel.
- Balanced analogue output on male XLR, left and right.
- Digital input on top RCA, SPDIF
- Digital output on right RCA, reclocked SPDIF
- Digital input on left RCA, BNC, XLR and Toslink optical receiver
- USB on bottom, Type B connector
- Mains inlet

Powering up

Before applying power to the b-DAC, ensure that the correct mains voltage is used. This can be either 230VAC or 115 VAC (+/- 10%). The correct voltage is indicated on the back panel in the "set for xxx V" zone.

After applying mains voltage, a dot will light up in the display on the front panel. While slowly changing its brightness, this dot indicates the b-DAC is in stand-by mode. This means that the electronics inside are not powered down but the sound is muted and all audio throughput and controls are disabled.

Although it is not environmentally friendly, Tentlabs advises you to leave the b-DAC permanently connected to the mains supply for the best sonic quality.

2. Operation and settings

The b-DAC offers a variety of settings, all of which are useful under some circumstances, but all of which should be reset to their factory default values prior to a first listening trial. This way you are ensured to experience the b-DAC the way Tentlabs prefers it.

All settings can be altered using the control knob on front of the b-DAC. This knob can be pushed (after releasing it will come forward again) and turned to the left and right (indefinitely). The display has three numerical digits with a dot next to each digit. These dots are multifunctional as explained further on. The User Interface of b-DAC is relatively basic. This is fine for basic controls like volume and source settings. Controlling extra settings is admittedly cryptic sometimes, although not necessary to set for general use.

All settings are stored after a change, thus will remain the same after disconnection from mains power.

Basic settings

The basic settings available on b-DAC are:

- Power ON and OFF (*On,OFF*)
- Source selection USB, Optical, SPDIF (*USb,AES,SPd,bnC,OPt*)
- Attenuation (volume) control 0–100 in steps of 1dB (*00,01,02.... 98,99, 100*)

A while after the desired volume or input setting has been set the display will show the preferred constant information, which can be the current selected input, incoming sample rate, attenuation, or a blank display. Upon a change of incoming sample rate, the display will automatically notify shortly.

Power

Power up:
Push the knob until the display shows *On* and then release it. After releasing the knob the display will show the current selected input source. If the volume setting is higher then zero the mute relay will automatically disengage after a short delay (*click*). The dot in the left display indicates mute status; dot on is muted, dot off is not muted.

Power down (stand-by):
Push the knob until the display shows *OFF* and then release it. The display will now only show a dot which varies its brightness and the analogue outputs will be muted (*click*).

Source selection

The b-DAC has five available digital input sources. These are *USb* (USB input), *OPt* (Toslink optical), *SPd* (S/PDIF on RCA), *bnc* (S/PDIF on BNC) and *AES* (AES/EBU on XLR). By pressing the knob briefly the sources change in a circular way; *AES,SPd,bnc,OPt,USb,AES*…etc.

The dot in the right display indicates lock status. A blinking dot indicates loss of lock. When this dot is constantly on, b-DAC is properly locked.

Attenuation (volume) control

The volume can be set in a range from 0 to 100 in steps of 1dB by turning the knob clockwise or counter-clockwise. A volume setting of 0 will completely mute the signal (display *00*), and activate the mute relay (*click*). The dot in the left display indicates mute status; dot on is muted, dot off is not muted.

Turning the volume to maximum (display *100*) will pass on the digital signal straight through to the DAC output without attenuation. Note that this setting is likely to be higher than ~70, so in case there seems to be no sound output in your system, try setting the attenuation at least at that level.

Quickly turning the knob will automatically result in bigger attenuation steps (±2 or ±4 dB). This way you can quickly get to the desired level, and still have fine resolution with slower turning.

Extra settings

The extra settings menu can be reached by pressing the knob and holding it pressed until ᴇ5ᴇ (Extra Settings) is displayed. After releasing the knob the display will show the first extra setting available: ʙʀ (display brightness). After a short while it will display the current setting and toggle between this and the menu name.
You can leave the extra settings at any point in the menu by pressing the knob and holding it pressed until the ᴇ5ᴇ is showed again. After releasing the knob ᴇ5ᴇ will blink a few times, indicating you have left the extra settings menu. After this the controls are limited again to the basic settings described in the previous chapter.

You can step through the available settings in a circular way by briefly pressing the knob. When a setting is displayed, you can alter it by turning the knob.

The available settings are successively (setting name, available options):

- ʙʀ (display [br]ightness), (0ı <-> ı0)
- 5dᴀ ([s]ample rate [D]AC), (48,96, ı92 or 44,88, ı76)
- 55ᴘ ([s]ample rate [S]PDIF), (48,96, ı92 or 44,88, ı76)
- dᖴ ([d]igital [f]ilter selection), (5ʜᴀ,5ʟ0)
- ᴘʜ ([ph]ase), (ⁿⁿ,ᵤᵤ)
- ᴘ ([p]rogram Infrared codes), (Uⁿ,Uᵤ,U-,ᴄⁿ,ᴄᵤ,ᴘ0,ᴀᴇ5,5ᴘd,ʙⁿᴄ,0ᴘᴛ,U5ʙ)
- UᴄᴏΟ (enable [v]olume [c]ontrol), (0ⁿ,0ᖴ)
- dı5 (default [dis]play type), (ᵤᴏʟ,5ᴀʀ,0ᖴᖴ,ıⁿᴘ)
- ʟʀ (balance), (ʟ+,ʟ ʀ, ʀ+)
- 0Uᴛ (Output level in volt RMS), (2ᵤ ,4ᵤ)
- 5ᵤ5 (software version 5, factory reset), (ᖴʀ)

ʙʀ *(display brightness)*

The brightness of the display can be changed in 9 steps from 0ı until ı0. The default setting for brightness is 05. You can vary the brightness by turning the knob left or right.
A while after the desired brightness setting has been set the display will toggle between ʙʀ and the current setting again.

5dA (sample rate DAC)

The b-DAC can process digital data on three different sample rates (frequencies). The selected sample rate has influence on the distortion performance and aliasing in the analogue domain. These technical facts have a slight influence on the sound character of your b-DAC, and can therefore be altered to suit your preference.
The default setting for the sample rate is 192 kHz or 176.4 kHz (*192* or *176*).

The b-DAC contains a very low jitter clock oscillator inside and a sample rate converter. Because of this the b-DAC can receive digital input signals on any sample rate from 32 till 200 kHz and convert them to a fixed user defined sample rate. This fixed sample rate can be altered in this menu. The available options depend on the used oscillator frequency and are either 44.1 kHz multiples or 48 kHz multiples.
The default oscillator in your b-DAC is 24.576 MHz which is related to multiples of 48 kHz. This means the three available sample rates are successively 48 kHz, 96 kHz and 192 kHz (*48,96,92*).
It is also possible to put in a 22.579 MHz oscillator in your b-DAC, which is related to multiples of 44.1 kHz. In this case the four available sample rates are 44.1 kHz, 88.2 kHz and 176.4 kHz (*44,88,76*)
Be sure to remove the internal jumper when using a 22.579 MHz oscillator, because this informs the micro processor about the used frequency.
A while after the desired sample rate setting has been set the display will toggle between *5dA* and the current setting again.

55P (sample rate SPDIF)

Similar to the selected sample rate of the DAC (extra menu *5dA*) it is possible to alter the frequency on which the b-DAC generates a low jitter reclocked SPDIF signal on the RCA output. This gives you the benefit to adjust the sample frequency required for use with an external DAC. This setting can be adjusted independently of the selected DAC sample rate and vice versa.
The default setting for the sample rate is 192 kHz or 176.4 kHz (*192* or *176*).
A while after the desired sample rate setting has been set the display will toggle between *55P* and the current setting again.

dF (digital filter)

The DAC chip has an internal digital filter which can be adjusted. This menu can tell this brickwall filter to roll of slowly (*5LO*) or sharp (*5HA*). In our experience this setting has a negligible effect on the sound character. Turn the knob to the left for (*5LO*) and right for (*5HA*).The default setting is sharp (*5HA*).
A while after the desired filter setting has been set the display will toggle between *dF* and the current setting again.

PH (Phase)

The absolute phase of the analogue output signal can be adjusted by 180 degrees. Turn the knob to the left for in phase (⊓⊓) and right for out of phase (⊔⊔) behaviour. The default setting is in phase (⊓⊓).
A while after the desired phase setting has been set the display will toggle between *PH* and the current setting again.

P (program infrared codes)

Your b-DAC has the ability to learn infrared commands from all kinds of remotes to control various settings. This means you can use a remote control you already own from another product to control the b-DAC. Supported IR formats include RC5, RC6 and Sony protocol. IR controllable settings are volume, input source selection, mute, and power on/off. The display will show the control to be programmed a while after *P* has showed up as the current menu step. This behaviour is unlike other menu steps where the name of the menu step is displayed after a setting has been made.
You can step through the available controls in a circular way by turning the control knob. (*U⊓,U⊔,U-,C⊓,C⊔,P0,AES,SPd,bnC,OPt,USb,U⊓,U⊔*, etc...)

Volume up:	*U⊓*
Volume down:	*U⊔*
Volume mute:	*U-*
Channel up:	*C⊓*
Channel down:	*C⊔*
Power:	*P0*
AES/EBU input:	*AES*
RCA S/PDIF input:	*SPd*
BNC S/PDIF input:	*bnC*
Optical input:	*OPt*
USB input:	*USb*

When the control to be programmed is selected, press a button on your remote control which you want to assign to it. If the outputted format of your remote control is accepted, *PPP* will show in the display. This means the command is stored. You can repeat this action for the other controls, and also for the same control to overwrite it. When a received code is already in use for another function, the display will show *P--*. This is implemented to prevent double use of codes and confusion.

UC0 (enable volume control)

There are situations in which it is desirable to disable the ability to control the volume. Setting *UC0* to the *0F* position will keep the current volume setting and disable the ability to alter it afterwards. It is therefore advisable to set the volume to maximum output (*I00*) before disabling the control. The default setting for volume control is (*0n*). A while after the desired setting has been set the display will toggle between *UC0* and the current setting again.

dıS (default display type)

There are four options to choose the default information that is displayed. You can choose between the current attenuation (_UOL_), selected input (_ınP_), incoming sample rate (_SAr_) or a completely dark display (_OFF_).
A while after the desired setting has been set the display will toggle between _dıS_ and the current setting again.

_Lr_ (balance)

You can change the balance between left and right in steps of 0.5dB with a maximum of 5 dB. Turn the knob left or right to move the balance accordingly. The default setting for balance is (_L r_).

SᴜS (software version, factory reset)

This menu step displays the version of the software currently programmed in your b-DAC. This information can be useful if there are any changes to the software in the future. To reset all extra settings to their defaults at once, turn the knob either way. The display will then show _Fr_.

Menu settings flow chart
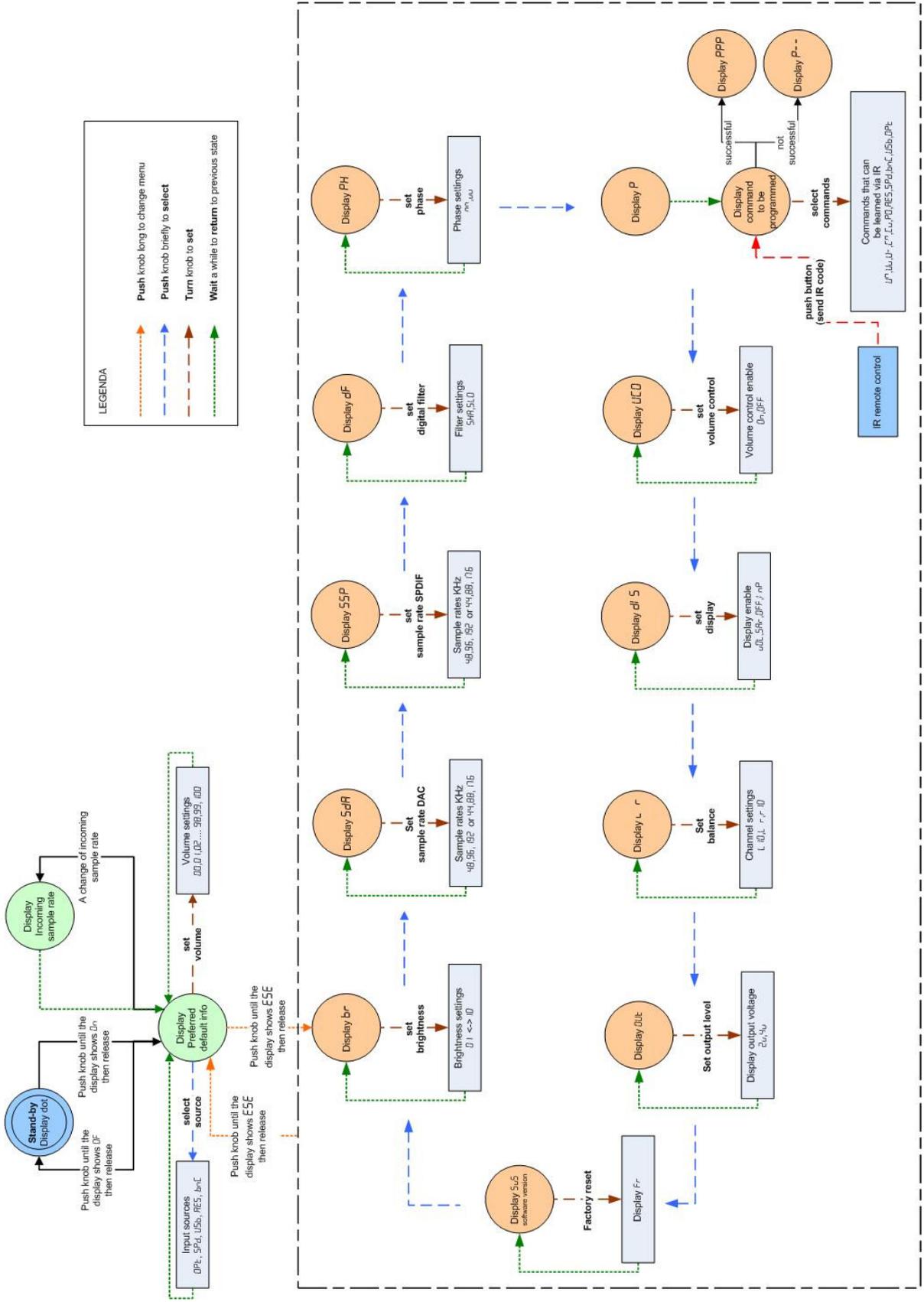
3. Troubleshooting

In case there is no audio coming out of your system, there are a few things to check:

- Make sure the power plug is properly connected and the b-DAC is out of standby (wiring/powering up page 6, basic settings page 8).
- Check if the correct source is selected and the b-DAC is locked properly to it (basic settings page 8).
- Check if the volume is not muted (basic settings page 8).
- Check if your audio cables are securely connected and if they are connected to the correct sockets (wiring up page 6).
- Try a different source on your power amplifier if applicable to make sure the problem is not caused by something else.
- If you are using USB, check if b-DAC is recognized as an audio playback device and select it to be used for that purpose.

In case there are dropouts in the sound:

- Check if your cables are securely connected.
- Avoid sharing the USB port with other hardware devices.
- Check if the computer is extremely busy with an application or low on resources.
- Check if your music medium (CD/DVD/File) is not damaged/corrupted

If none of these suggestions cure the problem, please do not hesitate to contact us.

4. Technical specifications

D/A converter	PCM1792
Sample rate converter	SRC4382
Up sampling	max 24 bit 192 kHz, frequency selectable
Analogue filter	Differential IV, 3rd order Butterworth
Frequency response	20 Hz to 20 kHz (±0.1dB)
THD @ 1 kHz 0 dBFs	<0.0008% 24bit @ 192 kHz
THD @ 1 kHz -10 dBFs	<0.001%
THD @ 20 kHz 0 dBFs	<0.0008%
S/N ratio	-107dBr @ 96 kHz
Total clock jitter	~ 1 pS > 10 Hz
Crosstalk @ 1 kHz	< -122dB
Crosstalk @ 20 kHz	< -110dB
Output impedance	< 30 ohms
Output level (unbalanced)	2.0 or 4.0 Vrms
Output level (balanced)	2.0 or 4.0 Vrms
USB input	16 bits 44.1 kHz or 48 kHz, no drivers required
All other inputs	24 bits 32 kHz up to 192 kHz
SPDIF output	75 ohm / low jitter / sample frequency selectable
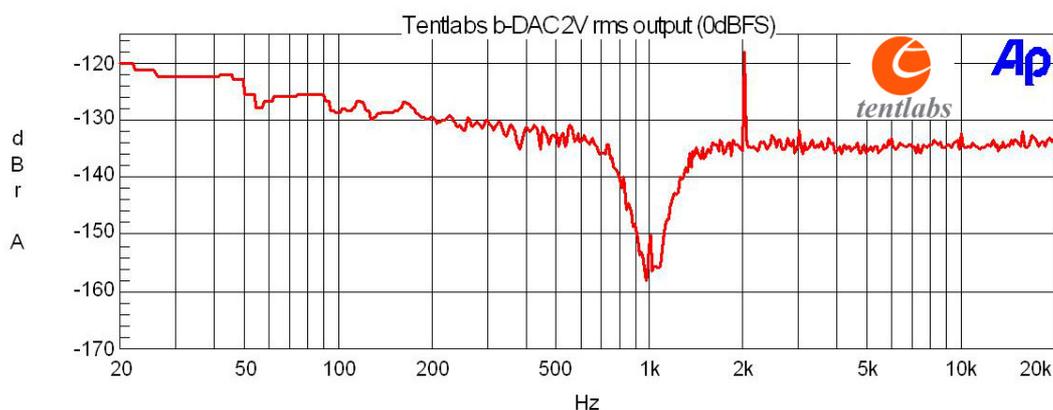
Dimensions (H x W x D)	70 x 210 x 330 mm
Package dimensions (H x W x D)	200 x 280 x 380 mm
Weight	3 kg

5. Warranty

Tentlabs warrants this product to be free of defects in material and workmanship for a period of two (2) years for parts and for a period of two (2) years for labour from the date of original purchase. This warranty is enforceable only by the original retail purchaser and cannot be transferred or assigned.

During the warranty period Tentlabs shall, at its sole and absolute option, either repair or replace free of charge any product that proves to be defective on inspection by Tentlabs or its authorized service representative. In all cases disputes concerning this warranty shall be resolved as prescribed by law. To obtain warranty service, the purchaser must first call or write Tentlabs at the address and telephone number printed below to obtain instructions where to send the unit for service. All enquiries must be accompanied by a description of the problem. All authorized returns must be sent to Tentlabs or an authorized Tentlabs repair facility postage prepaid, insured and properly packaged. Proof of purchase must be presented in the form of a bill of sale or some other positive proof that the product is within the warranty period.

Tentlabs reserves the right to update any unit returned for repair. Tentlabs reserves the right to change or improve design of the product at any time without prior notice. This warranty does not cover claims for damage due to abuse, neglect, alteration or attempted repair by unauthorized personnel, and is limited to failures arising during normal use that are due to defects in material or workmanship in the product.

In no event will Tentlabs be liable for incidental, consequential, indirect or other damages resulting from the breach of any express or implied warranty, including, among other things, damage to property, damage based on inconvenience or on loss of use of the product, and, to the extent permitted by law, damages for personal injury.

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