

# ULTRAVOICE DIGITAL VX2496



## User's Manual

Version 1.1 September 2003

ENGLISH

[www.behringer.com](http://www.behringer.com)



# ULTRAVOICE DIGITAL VX2496

## SAFETY INSTRUCTIONS



**CAUTION:** To reduce the risk of electric shock, do not remove the cover (or back). No user serviceable parts inside; refer servicing to qualified personnel.

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




This symbol, wherever it appears, alerts you to the presence of uninsulated dangerous voltage inside the enclosure—voltage that may be sufficient to constitute a risk of shock.



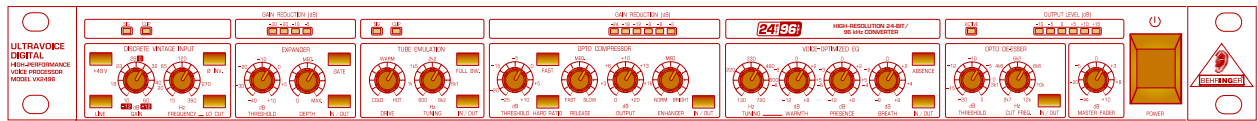
This symbol, wherever it appears, alerts you to important operating and maintenance instructions in the accompanying literature. Please read the manual.

## DETAILED SAFETY INSTRUCTIONS:

- 1) Read these instructions.
  - 2) Keep these instructions.
  - 3) Adhere to all warnings.
  - 4) Follow all instructions.
  - 5) Do not use this device near water.
  - 6) Clean only with a dry cloth.
  - 7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
  - 8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
  - 9) 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. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
  - 10) Protect the power cord from being walked on or pinched particularly at plugs, extension cords, and the point at which they exit the equipment.
  - 11) Only use attachments/accessories specified by the manufacturer.
  - 12) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the device. When a cart is used, use caution when moving the cart/device combination to avoid injury from stumbling over it.
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- 13) Unplug this piece of equipment during lightning storms or when not used for long periods of time.
  - 14) Refer all servicing to qualified service personnel. Servicing may be required when this piece of equipment has been damaged in any way, such as when power supply cord or plug is damaged, liquid has been spilled or objects have fallen inside, it has been exposed to rain or moisture, it does not operate normally, or has been dropped.

# ULTRAVOICE DIGITAL

Professional High-Performance Mic Preamplifier/Voice Processor with AES/EBU Output



- ▲ Ultra low-noise discrete vintage-design mic/line input stage
- ▲ 24-bit AES/EBU output with selectable 44.1, 48, 88.2 and 96 kHz sampling rates or external clocking
- ▲ Authentic tube emulation circuitry for typical tube and tape saturation sounds
- ▲ True RMS expander for extremely smooth noise reduction
- ▲ Opto compressor for inaudible level control and creative sound processing
- ▲ Integrated dynamic enhancer compensates for high-frequencies lost through compression
- ▲ Voice-optimized equalizer specially designed for voice enhancement
- ▲ Opto de-esser for quick removal of excessive sibilance from your vocal track
- ▲ High-performance VCAs for ultimate signal purity
- ▲ Ultra low-noise 4580 operational amplifiers for outstanding audio performance
- ▲ Accurate LED metering for crystal-clear level and processor indication
- ▲ Servo-balanced gold-plated XLR connectors for all main inputs and outputs
- ▲ Ultra high-precision ALPS® potentiometers for ultimate accuracy and repeatability
- ▲ Illuminated switches ensure perfect operation in dark stage environments
- ▲ High-quality components and exceptionally rugged construction for long life and durability
- ▲ Shielded toroidal power transformer for lowest noise interference
- ▲ Designed in Germany. Manufactured under ISO9000 certified management system

VX2496

# ULTRAVOICE DIGITAL VX2496

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Dear Customer,

welcome to the team of BEHRINGER users and thank you very much for expressing your confidence in us by purchasing the VX2496.

Writing this foreword for you gives me great pleasure, because it represents the culmination of many months of hard work delivered by our engineering team to achieve a very ambitious goal: to offer you a high-quality device whose flexibility makes it suitable for use both in studios and in the P.A.

rental market.

The task of designing our new ULTRAVOICE DIGITAL VX2496 certainly meant a great deal of responsibility which we assumed by focusing on you, the discerning user and musician. Meeting your expectations also meant a lot of work and night shifts. But it was fun, too. Developing a product usually brings a lot of people together, and what a great feeling it is when all who participated in such a project can be proud of what they've achieved.

It is our philosophy to share our enjoyment with you, because you are the most important member of the BEHRINGER team.

## 1. INTRODUCTION

Thank you for the confidence you have placed in us by purchasing the ULTRAVOICE DIGITAL VX2496. With the ULTRAVOICE DIGITAL you have acquired an extremely powerful device for creatively processing your music. Its professional design means the VX2496 can produce excellent results, both in the studio and live. Numerous features, such as the opto compressor or the voice-optimized EQ mean you can even process signals with a very wide dynamic range and tailor them to the overall sound of your music. In addition, the VX2496 has a digital AES/EBU output with a high-resolution 24-bit/96 kHz A/D converter and a wordclock input enabling synchronization to external devices.

The BEHRINGER ULTRAVOICE DIGITAL combines a microphone preamp, control amplifier and equalizer and is ideally suited for connection to a hard disk recording system where you could, for example, record vocals directly onto the hard drive. The highest quality is maintained, as any potential deterioration caused by inserting into a mixing console is eliminated. In addition, the integrated A/D converter ensures optimum conversion of the analog signal with no degradation of sound quality. And, due to its professional signal-processing features, the ULTRAVOICE DIGITAL is also the ideal tool for optimizing live vocals.

To familiarize yourself with the functions of the VX2496, simply connect any audio signal and try out each individual control. Use a relatively uncompressed signal (for example, one of your own recordings) in order to judge the effect of the opto-compressor. CDs are usually pre-compressed, which makes it difficult to hear how the compressor changes the sound.





Fig.



2.2:

Exp.

**An expander reduces the volume of a signal in low-level passages. This way, interference such as tape noise and spill can be removed.**

-  The *IN/OUT* button switches the expander in or out of the signal path.
-  The *THRESHOLD* control determines the level at which the expander cuts in.

The amount of gain reduction is determined using the *DEPTH* control. The higher the value, the more the gain is reduced.

-  When the *GATE* button is pressed, the expander functions as a noise gate. This has a more radical effect on the sound, as it not only attenuates but also completely eliminates low-level passages. For this reason the gate function should primarily be used with individual signals, thus not risking any unwanted effect on the existing recording.
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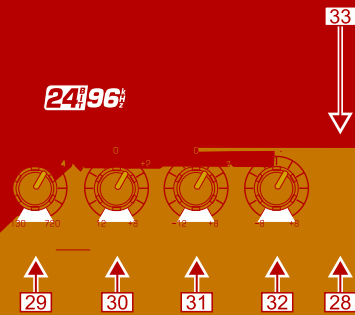
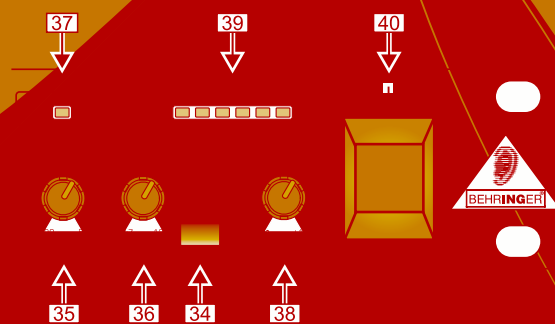


Fig. 2.4: Voice-optimized EQ

The voice-optimized EQ is a 3-band equalizer used for sound shaping. You can boost or cut frequency ranges in order to equalize weaknesses in the input signal.

- [28] Activate the voice-optimized EQ with the *IN/OUT* button.
- [29] Use the *TUNING* control to select a frequency range (130 Hz to 720 Hz).
- [30] The selected frequency range can be boosted or cut using the *WARMTH* control. Cut employs a narrower bandwidth than that used for boost, enabling you to tailor the filter to your specific needs.
- [31] Use the *PRESENCE* control to add high and upper-mid frequencies to the signal (around 1.7 kHz). This helps to push vocals to the forefront with more presence in the overall sonic image.
- [32] Use the *BREATH* control to boost or cut typical noises associated with the voice (e.g. breathing) at around 8 kHz.
- [33] The *ABSENCE* button cuts the level of those frequencies that cause an unappealing, harsh sound. These lie around the area of 4 kHz.

## 2.5 Opto decompensation

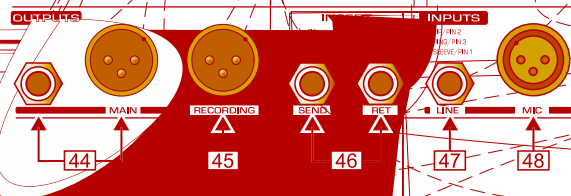


# ULTRAVOICE DIGITAL VX2496

- ☞ To avoid coloring the timbre of the sound, do not set the threshold too low when using the opto-de-esser. When the threshold is set at its optimal value, the effect should only be recognizable by direct comparison to the unprocessed signal using the IN/OUT button.
- 38 Use the *MASTER FADER* to match the output signal level to the input sensitivity of the following device (e.g. your DAT or hard disk recorder).
- ☞ Start by tuning the *MASTER FADER* right down and increase it slowly to the desired level. If you start with too high a level, you risk overloading the inputs of the devices that follow.
- 39 The six *OUTPUT LEVEL* LEDs show the level of the output over a -10 to +15 dB range. Ensure that the output level does not go into overdrive, otherwise the signal at the DIG OUT output will be too high and cause distortion.
- 40 Use the *POWER* button to turn on the ULTRAVOICE DIGITAL.

## 2.6 Rear panel connectors

BEHRINGER® ULTRAVOICE  
MODEL VX2496  
CONCEIVED AND DESIGNED  
BY BEHRINGER GERMANY,  
ASSEMBLED IN CHINA  
UNDER ISO9000 CERT.



connections  
ULTRAVOICE DIGITAL  
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connection to a DAT  
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# ULTRAVOICE DIGITAL VX2496

- 3) If necessary you can then smooth out the dynamics of the vocal slightly with the opto compressor. Be sure not to compress the signal too much; the compressor can always be used again after the recording. Also, do not use the hard ratio function at this stage as it makes a very audible difference in the signal. If the vocalist constantly changes his distance from the microphone during recording, extreme dynamic fluctuations may result. In this case, a higher level of compression should be used. Keep the threshold relatively low on the opto compressor to obtain a normal volume level.

 **To avoid having to compress the signal too much, try to maintain a constant distance between the vocalist and the microphone while recording.**

Backing vocals should be highly compressed so they can be present throughout the recording without volume fluctuations.

- 4) The voice-optimized EQ allows you to equalize deficiencies in the sound image that could not be corrected in advance. However, do not use extreme settings here either, as you can add more EQ when mixing. The voice-optimized EQ can be used to deal with the following problems:

▲ **If the vocals sound muddy in the bass range, you can cut the low-frequency area of the signal by using the WARMTH control. Set the control to full cut and locate the intrusive frequency range with the TUNING control so that the voice sounds more balanced. You should try this in solo mode first. Then, listen to the voice with the rest of the mix and adjust the WARMTH control until the overall sound is right.**

▲ **If the voice sounds too edgy, use the ABSENCE button on the voice-optimized EQ. This will attenuate these harsh frequencies without compromising the natural quality of the overall sound. In addition, you can boost the low frequencies with the WARMTH control or, if necessary, improve the peaky characteristic of the signal by lowering the BREATH or PRESENCE control.**

▲ **If the voice is getting lost in the mix, increase the PRESENCE control. Boosting this range will help the voice to cut through more.**

▲ **If the vocal sound is not brilliant enough, you can add peaks using either the PRESENCE or the BREATH control. Additionally, you can use the opto-compressor enhancer to add upper harmonics artificially.**

- 5) If the signal contains unwanted frequency areas, use the expander and the opto de-esser to remove them. Sibilance can be removed with the opto de-esser, but first you must isolate the intrusive frequency range:

▲ **Activate the voice-optimized EQ and turn the BREATH control up to exaggerate sibilant frequencies. If you have already used the EQ, first make a note of the original settings so they can be subsequently reset.**

▲ **Activate the opto de-esser and, using a low threshold, turn the CUT FREQ control until the sibilance is reduced.**

▲ **Now turn the voice-optimized EQ off again and reset the BREATH control to its original position.**

▲ **Now set the threshold so the ACTIVE LED only lights up when sibilance is present.**

The expander enables you to remove intrusive noise from quiet passages. To do this, turn the THRESHOLD control to the far left and turn it up slowly with DEPTH set at medium. Find the value at which you notice an audible suppression of the quiet spots without impairing the vocal sound.

Only use the gate in exceptional cases—if, for instance, you want to achieve a specific effect. It radically affects the sound and could thus ruin your recording.

- 6) Use the tube emulation for a “classic” analog tape recording sound.

- 7) Finally, use the MASTER FADER to regulate the ULTRAVOICE DIGITAL's output.

## 4. MIXING WITH THE ULTRAVOICE DIGITAL

Go ahead and experiment with the mixing possibilities of the ULTRAVOICE DIGITAL and push it to its limits. It is often the case that extreme effect and filter settings are needed to optimally integrate a signal into the mix. If a voice ultimately appears as very full and present in the mix, it usually means the signal has been thoroughly and truly “tweaked”.

Vocals usually have reverb added during the mix. If you notice intrusive noise (e.g. sibilance) in the reverb, use the opto de-esser to remove it as follows:

▲ **Remove the sibilance from the vocal as previously described in chapter 3.5 and drive the reverb unit via one of the main outputs (not via the INSERT path as it is sourced before the de-esser). Make sure the reverb unit is set to 100% wet, i.e. there is no dry direct signal present.**

▲ **The reverb signal can now be mixed at the console with the signal from the VX2496's RECORDING output. This is sourced before the de-esser, and in this way sibilance is removed only from the reverb signal, not the main voice itself.**

The expander can be used to remove spill from other instruments which, for example, may have been picked up by the microphone from the vocalist's headphones. Remember that compression would have the opposite effect, as the signal is limited at the loudest spots. Any spill would then become effectively louder.

Although the ULTRAVOICE DIGITAL was principally designed to record vocals, you can of course also use it to record and mix other signals.


### 4.1 Hints about analog output level setting

The output level meter has been calibrated to +4 dBu. For Main Out, this means the following: if OUTPUT LEVEL METER shows 0 dB, +4 dBu is connected to Main Out. This way, you have positioned the optimal level of the output signal in order to create maximum rejection with sufficient headroom.

Hint: Some equipment requires a lower input signal level (-10 dBV; in home recording domain). Use the input signal level displays of such equipment as well as the output level control of the VX2496 to create optimal adjustments.

### 4.2 Hints about digital output level setting

The maximum level for digital signals is 0 dBFS. If the OUTPUT LEVEL-LEDs indicate +15 dB, this signal level is located at the digital output of the VX2496. Always keep in mind that a signal level higher than 0 dBFS/+15 dB will immediately lead to harsh distortion. Therefore, we suggest that you always stay well below this value in order to avoid distortion and increase headroom for signal peaks.

 **Please always make sure that the clip LED at the input is seldom or never lit.**

## 5. LIVE APPLICATIONS WITH THE ULTRAVOICE DIGITAL

The ULTRAVOICE DIGITAL is a versatile problem-solver and sound-shaper both in live and studio environments.

On a small stage, short distances between the microphone and the monitor speaker can lead to unpleasant feedback. In this case the VX2496 opto de-esser could be used to suppress feedback:

▲ **Set the THRESHOLD control relatively low.**

▲ **Use the CUT FREQ control to find the frequency causing the feedback.**

▲ **Now turn the threshold up far enough to eliminate the feedback while maintaining an unaffected vocal signal as much as possible.**



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# ULTRAVOICE DIGITAL VX2496

## 8. SPECIFICATIONS

### AUDIO INPUTS

MIC Line	XLR connector, HF shielded, balanced XLR connector and 1/4" jack HF shielded, balanced
Insert Return Impedance	1/4" jack unbalanced
MIC Line	1.3 k $\Omega$ unbalanced, 2.6 k $\Omega$ balanced XLR connector and 1/4" jack
Insert Return	10 k $\Omega$ unbalanced, 20 k $\Omega$ balanced 10 k $\Omega$ unbalanced
Max. Input Level	
MIC Line	+11 dBu unbalanced and balanced XLR and jack +21 dBu balanced and unbalanced
Insert Return	+21 dBu
CMRR	typical 40 dB, >60 dB @ 1 kHz (except Insert Return)

### AUDIO OUTPUTS

Recording Out XLR	Electronically controlled servo-balanced output stages
Main Out XLR	Electronically controlled servo-balanced output stages
Main Out Jack Impedance	1/4" jack unbalanced
Rec. Out	120 $\Omega$ balanced, 60 $\Omega$ unbalanced @ 1 kHz
Main Out XLR	120 $\Omega$ balanced, 60 $\Omega$ unbalanced @ 1 kHz
Main Out Jack	100 $\Omega$ unbalanced @ 1 kHz
Insert Send	100 $\Omega$ unbalanced @ 1 kHz
Output Level	
Rec. Out	max. +21 dBu balanced and unbalanced
Main Out XLR	max. +21 dBu balanced and unbalanced
Main Out Jack	max. +21 dBu unbalanced
Insert Send	max. +21 dBu unbalanced

### SYSTEM DATA

Bandwidth	20 Hz to 20 kHz, +0/-0.6 dB
Frequency Response	Line: <10 Hz to >200 kHz, +0/-1.7 dB -> Main Out MIC: <10 Hz to >200 kHz, +0/-2.5 dB -> Main Out
S/N Ratio	123.6 dB dynamics -> Insert Send 118.5 dB dynamics -> Main Out 122 dB dynamics -> Recording Out 130 dB E.I.N, Mic In -> Insert Send 105 dB Line -> Insert Send @ +4 dBu/1 kHz
THD	0.006% typ. @ -30 dBu, 1 kHz, Gain 30 dB, Mic In -> Insert Send 0.01% typ. @ -30 dBu, 1 kHz, Gain 30 dB, Mic In -> Main Out 0.001% typ. @ +4 dBu, 1 kHz, Unity Gain, Line In -> Insert Send 0.004% typ. @ +4 dBu, 1 kHz, Unity Gain, Line In -> Main Out

### DIGITAL OUTPUT

Type	High-resolution 24-bit AKMA/D converter
Standard	AES/EBU / XLR transformer-balanced
Output Impedance	110 $\Omega$ balanced
Nom. Output Level	5 V peak-to-peak

### INTERNAL SAMPLING FREQUENCY

44.1 / 48 / 88.2 / 96 kHz (switchable)

### WORDCLOCK INPUT

Type	BNC
Frequency Range	31 to 100 kHz
Input Impedance	100 k $\Omega$
Nom. Input Level	2 to 5 V peak-to-peak

### EXPANDER/GATE SECTION

Type	RMS Expander
Threshold	variable (OFF to +10 dB)
Ratio	Expander: variable (1:1 to 3:1) Gate: 1: $\infty$
Attack	<1 msec / 20 dB, fixed
Release	100 msec / 20 dB, fixed

### COMPRESSOR SECTION

Type	Opto Compressor
Threshold	variable (-25 to +10 dB)
Ratio	switchable (3:1 / 9:1)
Manual Release Time	variable (10 dB / 10 msec to 10 dB / 1.5 sec)
Manual Attack Time	10 dB / 10 msec
Output	Fast: 20 dB / 10 msec variable (0 bis +20 dB)

### DE-ESSER SECTION

Type	VAD (Voice-Adaptive)-De-Esser
Filter Frequency	2.7 to 12 kHz
Filter Quality	program-dependent, max. Q = 4
Attenuation	max. 18 dB

### TUBE EMULATION SECTION

Filter Frequency	variable, 800 Hz to 12kHz
Peak Frequency	Full Bandwidth, lower Cut-off Frequency = 200 Hz
Characteristic	Band Pass, 1st Order (6 dB/Oct.) Full Bandwidth: High Pass, 1st Order (6 dB/Oct.)
Boost	variable, max. 20 dB

### VOICE OPTIMIZED EQ SECTION

Bands	3
Filter Quality	Boost: 0.4 / Cut: 3
Filter Frequencies	Breath: Type shelving, lower Cut-off Frequency 10 kHz Presence: Type peak, Peak Frequency 1.5 kHz Warmth: Type peak, semiparametric Peak Frequency variable from 130 to 720 Hz

### POWER SUPPLY

Mains voltage	USA/Canada 120 V~, 60 Hz Europe/U.K./Australia 230 V~, 50 Hz Japan 100 V~, 50 - 60 Hz General export model 120/230 V~, 50 - 60 Hz max. 25 W
Power Consumption	100 - 120 V~: T 630 mA H
Fuse	200 - 240 V~: T 315 mA H
Mains Connection	Standard IEC Receptacle

### DIMENSIONS (H x W x D)

approx. 1 3/4" (44.5 mm) x  
19" (482.6 mm) x 8 1/2" (217 mm)

### WEIGHT

approx. 2.2 kg

### SHIPPING WEIGHT

approx. 3.4 kg

BEHRINGER makes every effort to ensure the highest standard of quality. Necessary modifications are carried out without notice. Thus, the specifications and design of the device may differ from the information given in this manual.

## 9. WARRANTY

### § 1 WARRANTY CARD/ONLINE REGISTRATION

To be protected by the extended warranty, the buyer must complete and return the enclosed warranty card within 14 days of the date of purchase to BEHRINGER Spezielle Studioteknik GmbH, in accordance with the conditions stipulated in § 3. Failure to return the card in due time (date as per postmark) will void any extended warranty claims. Based on the conditions herein, the buyer may also choose to use the online registration option via the Internet ([www.behringer.com](http://www.behringer.com) or [www.behringer.de](http://www.behringer.de)).

### § 2 WARRANTY

1. BEHRINGER (BEHRINGER Spezielle Studioteknik GmbH including all BEHRINGER subsidiaries listed on the enclosed page, except BEHRINGER Japan) warrants the mechanical and electronic components of this product to be free of defects in material and workmanship for a period of one (1) year\* from the original date of purchase, in accordance with the warranty regulations described below. If the product shows any defects within the specified warranty period that are not excluded from this warranty as described under § 4, BEHRINGER shall, at its discretion, either replace or repair the product using suitable new or reconditioned parts. In the case that other parts are used which constitute an improvement, BEHRINGER may, at its discretion, charge the customer for the additional cost of these parts.

2. If the warranty claim proves to be justified, the product will be returned to the user freight prepaid.

3. Warranty claims other than those indicated above are expressly excluded.

### § 3 RETURN AUTHORIZATION NUMBER

1. To obtain warranty service, the buyer (or his authorized dealer) must call BEHRINGER (see enclosed list) during normal business hours **BEFORE** returning the product. All inquiries must be accompanied by a description of the problem. BEHRINGER will then issue a return authorization number.

2. Subsequently, the product must be returned in its original shipping carton, together with the return authorization number to the address indicated by BEHRINGER.

3. Shipments without freight prepaid will not be accepted.

### § 4 WARRANTY REGULATIONS

1. Warranty services will be furnished only if the product is accompanied by a copy of the original retail dealer's invoice. Any product deemed eligible for repair or replacement by BEHRINGER under the terms of this warranty will be repaired or replaced within 30 days of receipt of the product at BEHRINGER.

2. If the product needs to be modified or adapted in order to comply with applicable technical or safety standards on a national or local level, in any country which is not the country for which the product was originally developed and manufactured, this modification/adaptation shall not be considered a defect in materials or workmanship. The warranty does not cover any such modification/adaptation, irrespective of whether it was carried out properly or not. Under the terms of this warranty, BEHRINGER shall not be held responsible for any cost resulting from such a modification/adaptation.

3. Free inspections and maintenance/repair work are expressly excluded from this warranty, in particular, if caused by improper

handling of the product by the user. This also applies to defects caused by normal wear and tear, in particular, of faders, crossfaders, potentiometers, keys/buttons, tubes and similar parts.

4. Damages/defects caused by the following conditions are not covered by this warranty:

▲ improper handling, neglect or failure to operate the unit in compliance with the instructions given in BEHRINGER user or service manuals.

▲ connection or operation of the unit in any way that does not comply with the technical or safety regulations applicable in the country where the product is used.

▲ damages/defects caused by force majeure or any other condition that is beyond the control of BEHRINGER.

5. Any repair or opening of the unit carried out by unauthorized personnel (user included) will void the warranty.

6. If an inspection of the product by BEHRINGER shows that the defect in question is not covered by the warranty, the inspection costs are payable by the customer.

7. Products which do not meet the terms of this warranty will be repaired exclusively at the buyer's expense. BEHRINGER will inform the buyer of any such circumstance. If the buyer fails to submit a written repair order within 6 weeks after notification, BEHRINGER will return the unit C.O.D. with a separate invoice for freight and packing. Such costs will also be invoiced separately when the buyer has sent in a written repair order.

### § 5 WARRANTY TRANSFERABILITY

This warranty is extended exclusively to the original buyer (customer of retail dealer) and is not transferable to anyone who may subsequently purchase this product. No other person (retail dealer, etc.) shall be entitled to give any warranty promise on behalf of BEHRINGER.

### § 6 CLAIM FOR DAMAGES

Failure of BEHRINGER to provide proper warranty service shall not entitle the buyer to claim (consequential) damages. In no event shall the liability of BEHRINGER exceed the invoiced value of the product.

### § 7 OTHER WARRANTY RIGHTS AND NATIONAL LAW

1. This warranty does not exclude or limit the buyer's statutory rights provided by national law, in particular, any such rights against the seller that arise from a legally effective purchase contract.

2. The warranty regulations mentioned herein are applicable unless they constitute an infringement of national warranty law.

\* Customers in the European Union please contact BEHRINGER Germany Support for further details.

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