

Millennia  
*Media*

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# OWNER'S MANUAL



HIGH VOLTAGE  
MICROPHONE  
PREAMPLIFIER  
Model HV-3B



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## **MIC PREAMP PROTECTION -- SAFE USE PLEASE READ BEFORE USING YOUR MIC PREAMP!**

Back-to-back Zener diodes protect the super-matched octet of input transistors against high transients common when inserting and extracting microphones. There are certain rare instances which can contribute to failed zener diodes. To maintain top performance and protect your front-end zeners, please follow these guidelines:

- 1.) **Do not insert or extract XLR connectors with +48 volt phantom power on.** Assure that preamp power, and especially phantom power, is off when inserting or removing microphones or line cables. Assure that whatever destination the preamp is feeding is also powered off. Normally, XLR insertions with power on will *not* harm preamp circuits. However, there are rare instances where insertion spikes due to power/ground imbalances can lead to failed Zeners.
- 2.) **Avoid ground imbalances between input, output, and AC power.** Always review your grounding scheme before connecting microphones; especially where AC power ground is sensed by mic preamp **and all devices connected to/from mic preamp**. All devices (tube mics, preamp, recorder, mixer, or other electrical source or destination) should be referenced to a **single ("star point") earth ground** or unwanted potential can develop via ground imbalances. This is especially true in large halls where the preamp is feeding far-removed destinations. In some venues, we've seen ground differential greater than 5 volts.

In such situations, you might try lifting selective *audio* grounds (**not** power grounds) or using an AC power isolation transformer — especially when (1) using tube mics with remote power supplies or (2) feeding far-removed control room gear which may be at different ground potential (that is, plugged into an AC outlet which is different from that being used by the mic preamp). These are the common culprits in ground imbalances leading to high energy transient contact spikes: leading to blown zener diodes. Another cure is to use audio path transformers, but you will *always* pay a *sonic* penalty in doing so...

Using caution and following these common safety tips will assure years of trouble-free operation with your Millennia Media mic preamps. Call us if you have any questions.

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# READ THIS FIRST!

Any changes or modifications not expressly approved by MILLENNIA MEDIA, INC. could void your authority to operate this equipment under the EC or FCC rules.

1. Copyright: You acknowledge that no title to the intellectual property in the HV-3B is transferred to you.
2. Inspect packing box and HV-3B unit for damage, unusual marks, or shortages. It is your responsibility to report damage, shortage, or misshipments in a timely manner. Millennia Media and/or its dealers will not be responsible for claims arising from damage in shipping, nor will claims for shortage or misshipments be honored more than 30 days after ship date.
3. Read this manual carefully and completely before attempting to use the HV-3B. Improper operation could result in damage to microphones, HV-3B unit, ancillary gear, and so forth. The HV-3B provides access to high DC voltage — it is the user's responsibility to understand the safe use and operation of this device.
4. The shipping box should include (1) owner's manual, (2) HV-3B unit, (3) a UL approved power cord and (4) an owner's registration card. Fill out the owner's registration card and return to Millennia Media at your earliest ability.

The material contained in this manual consists of information that is property of Millennia Media, Inc. and is intended solely for use by the purchasers of the equipment described in this manual. Millennia Media, Inc. expressly prohibits the duplication of any portion of this manual or the use thereof for any purpose other than the operation and/or maintenance of the equipment described in this manual without the express written permission of Millennia Media, Inc. Under copyright laws, this manual may not be duplicated in whole or in part without the written consent of Millennia Media, Inc..

The serial number is located on the rear left side of the unit. We suggest that you record the serial number in the space provided below. Refer to it whenever you call an authorized Millennia Media repair facility or the manufacturer. Make sure that you return your completed warranty card immediately.

Features and specifications subject to change without notice.

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Serial No. \_\_\_\_\_

Purchase Date \_\_\_\_\_

Store Where Purchased \_\_\_\_\_

# SAFETY PRECAUTIONS

For your safety and the safety of others, be sure to read and understand all safety and operational instructions before attempting to use the HV-3B. Carefully observe all warnings, precautions, and instructions on the HV-3B and as described in the instructions supplied with the unit.

## 1. WATER, MOISTURE, AND SPILLAGE

Do not attempt to use this unit in, near, or around water or in unusually moist environments, such as near a sink or swimming pool. Prevent liquids or any other materials or objects from spilling or falling into the unit's top, side, or ventilation openings.

## 2. HEAT AND VENTILATION

Be sure to allow adequate ventilation to the unit and avoid using or installing unit in close proximity to heat sources, such as heaters, stoves, radiators, power amplifiers, spotlights, or other heat-producing appliances or equipment.

## 3. POWER SOURCES AND POWER CORD PROTECTION

This unit should be connected to a power source only of the type described in the operating instructions or as marked on the HV-3B. Route the power cord so that it is not likely to be walked on or pinched by having objects placed on it. Pay particular attention to plugs, receptacles, and the point where the power cord exits the HV-3B.

## 4. GROUNDING

For your safety, it is extremely important that the grounding pin of the 3-wire power cable (included with unit) be inserted into a grounding type 3-pin power outlet. If you are unable to insert the plug into an existing outlet, contact an electrician to install a properly grounded 3-pin power outlet.

## 5. DAMAGE REQUIRING SERVICE

This unit should be repaired or serviced by qualified personnel whenever:

- The AC power cord has been damaged, or
- Objects have fallen or liquid has spilled into the unit, or
- The unit does not function properly or exhibits a marked change in performance, or
- The unit has been abused, dropped, or damaged, or
- The unit has been exposed to rain or moisture

## 6. SERVICING

The user should not attempt to repair or service this unit. All servicing and/or repairs should be referred to Millennia authorized service personnel.

If, after reading all instructions, precautions, and warnings, you have remaining questions, please contact Millennia Media directly before attempting to use your HV-3B. Retain this owner's manual as a record of your purchase to aid positive identification in the event of loss.

# IMPORTANT INFORMATION ON HV-3B PREAMP PROTECTION

Eight back-to-back low impedance Zener diodes protect the super-matched octet of input transistors against high transient energy spikes common when inserting and extracting XLR connectors. There are certain environments which can lead to failed zener diodes. To maintain top performance and protect the HV-3B sensitive front-end, please follow these guidelines:

1.) *Do not insert or extract XLR connectors with preamp AC power on.* Assure that preamp power is off when inserting or removing microphones or line cables. Assure that whatever destination the preamp is feeding is also powered off.

2.) *Avoid ground imbalances between input, output, and AC power.* Always review your grounding scheme before connecting microphones; especially where AC power ground is sensed by mic preamp *and all devices connected to HV-3B*. All devices (tube mics, self-powered mics, preamp, recorder, mixer, or any other electrical source or destination) should be referenced to a *single "star" earth ground* or unwanted potential can flow via ground imbalances. This is especially true in large venues or studios where the preamp is feeding far-removed destinations. In large halls, we've seen ground differential on the order of 5 volts AC, and greater.

You might try lifting certain audio grounds (*not power grounds!*) or using an AC power isolation transformer — especially when (1) using tube mics with remote power supplies or (2) feeding far-removed control room gear which may be at different ground potential (that is, plugged into an AC outlet which differs from that being used by the mic preamp). These are the common culprits in ground imbalances leading to transient interconnect spikes: leading to blown zener diodes.

Sometimes, if the transient energy is especially large, the bases of the input transistors can also fail. Using caution and following these safety tips will assure years of trouble-free operation with your Millennia mic preamps.

## OVERVIEW

Millennia Media has long enjoyed a reputation for what many engineers have called the world's most musically and dynamically accurate microphone preamplifiers. Now, with the addition of high resolution A/D converter option one chassis, sonic excellence and professional convenience are combined. Moreover, as digital technology improves, the Millennia HV-3B allows easy upgrade to successive generations of converter technology. With B&K high voltage inputs, a fully balanced signal path, enormous input and output headroom, unmatched technical specifications, world-class internal componentry, open architecture A/D conversion, and unparalleled sonic performance, the Millennia Media HV-3B is destined to become a true classic in pro audio — and will remain contemporary well into the next century. Hence, *Millennia Media*.

## QUICK START!

Congratulations on your purchase of the Millennia Media HV-3B High Voltage Stereo Microphone Preamplifier. The HV-3B is the result of meticulous listening tests on numerous circuit, topology, and packaging designs. Your HV-3B is a finely tuned instrument intended for critical professional applications — we feel it offers the most accurate microphone preamplification available. With the emergence of 20+ bit digital audio, recording engineers are faced with a new requirement for undistorted dynamic range. The HV-3B meets this challenge exceptionally well.

Before connecting power to the HV-3B, assure that the rear panel voltage selection switch is set correctly. In the USA, the HV-3B is shipped with the voltage selection switch set to 115VAC. At this voltage setting, a 1/2 amp, slow blow fuse has been factory installed. If you change the voltage selection switch for 230VAC usage, be sure to change the fuse to a 1/4 amp type.

The HV-3B cabinet measures 19" wide x 1.7" high x 12.5" deep (483 x 43 x 318 mm) and is designed for mounting into a standard 1U, 19" equipment rack. If the HV-3B is mounted in a road case or other rack which is prone to strong vibration or shock, it is recommended that the rear of the chassis be supported or otherwise reinforced to withstand such conditions.

Because the HV-3 is a high bandwidth, high gain device (i.e., >1000:1 voltage gain), always locate the cabinet sufficiently far from hum or RF generating devices, such as computers, power amplifiers, dimmers, or anything which implements a power transformer. Use care, as well, to avoid connecting the HV-3B to line-power which is shared by dimmers or stage lighting. When these basic precautions are followed, the HV-3's internal RF line filter and proprietary toroidal power supply assure ultra-quiet audio.

The HV-3B is designed on a low impedance, common ground topology. The power cord earth ground (green wire) is strapped to the chassis *and* pin 1 of all audio XLR connectors. For high quality operation, and for your own safety and the safety of others, do not defeat the purpose of the grounding pin on the A/C power cord! If you are using B&K 130VDC microphones (4003, 4004, 4009, 4012, etc.), read page 13 first before continuing.

# FRONT PANEL FUNCTIONS

## (1) INPUT SELECT "HIGH VOLTAGE / NORMAL" SWITCH (OPTION)

HV-3B units without this option will exhibit the following front-panel features: (1) a black nylon hole cover will replace the toggle switch and, (2) the +130V LED DC Power Indicator will not illuminate.

With the Input Select switch in the down "Normal" position, the HV-3B receives mic-level audio from the three pin XLR (female) mic input. With this switch in the up "High Voltage" position, the HV-3B receives mic-level audio from the four pin XLR input. If you are using B&K high voltage microphones with four pin XLRs, place this switch in the up position. If conventional microphones are used, place switch in the down position. The HV-3B will not combine ('mix') both inputs simultaneously. NOTE: The HV-3B is designed to provide uninterrupted DC power to B&K high voltage microphones, regardless of the Input Select switch setting. Thus, a B&K high voltage microphone connected to the four pin XLR connector will *always receive DC power on pin 3* if the HV-3B is operational, i.e., the HV-3B is considered 'operational' if it is connected to normal AC line power and all green front panel LED power indicators are illuminated.

**CAUTION: Adjustment of this switch will cause a momentary popping noise on the line output.**

## (2) PHANTOM POWER "+48V / OFF" SWITCH

With the Phantom Power switch in the down "Off" position, phantom power is inactive. Use the down setting with moving coil, ribbon, and other conventional dynamic microphones. With this switch in the up "+48V" position, phantom power is applied simultaneously through dual 6.81k ohm resistors to pins 2 and 3 of the three pin XLR (female) mic input connector. Use +48V with condenser and other microphones requiring traditional phantom powering. When the Input Select switch (item #1, above) is in High Voltage mode (four pin XLR input selected), the Phantom Power switch is disabled, regardless of setting.

**CAUTION: Adjustment of this switch will cause a momentary popping noise on the line output.**



### (3) GAIN CONTROL "GAIN" (Standard Resolution)

A stepped rotary gain switch is standard on HV-3B units. The gain control employs a superior quality Grayhill gold-contact switch. Switched gain is 5 dB per step, 10 to 65 dB, from 7 o'clock to 5 o'clock, and is stereo matched to an inter-channel variance of less than .04 dB at any setting. A utility low-gain setting of approximately 8.8 dB is available at the 6 o'clock position. Adjustment of this switch may cause a brief popping noise.

#### (3a) GAIN CONTROL "GAIN" (High Resolution - Option)

A high resolution stepped rotary gain switch is optionally available on new HV-3Bs or as a factory retrofit. The gain control employs superior quality Grayhill and C&K gold-contact switches. Switched gain is approximately 1.5 dB per step, 8 to 60.5 dB, and is stereo matched to better than .04 dB inter-channel variance at all settings. After a brief warm-up period, adjustment of this switch is virtually silent.

A three position toggle is used for "ranging" the rotary gain switch. When the toggle switch is in the middle position, the HV-3B mic preamp gain ranges from +26 to +42.5 dB. When the toggle switch is in the up or down position, simply add or subtract 18dB, respectively, from these gain settings. For example, if the switch is down, and the gain control is set to the 12 o'clock position, subtract 18 from 35. Your gain is +17 dB. If the toggle switch is up, add 18 to 35 = +53 dB gain. The following is a chart of gains at every possible setting:

#### TOGGLE SWITCH DOWN POSITION

8, 9.5, 11, 12.5, 14, 15.5, 17, 18.5, 20, 21.5, 23, 24.5

#### TOGGLE SWITCH MIDDLE POSITION

26, 27.5, 29, 30.5, 32, 33.5, 35, 36.5, 38, 39.5, 41, 42.5

#### TOGGLE SWITCH UP POSITION

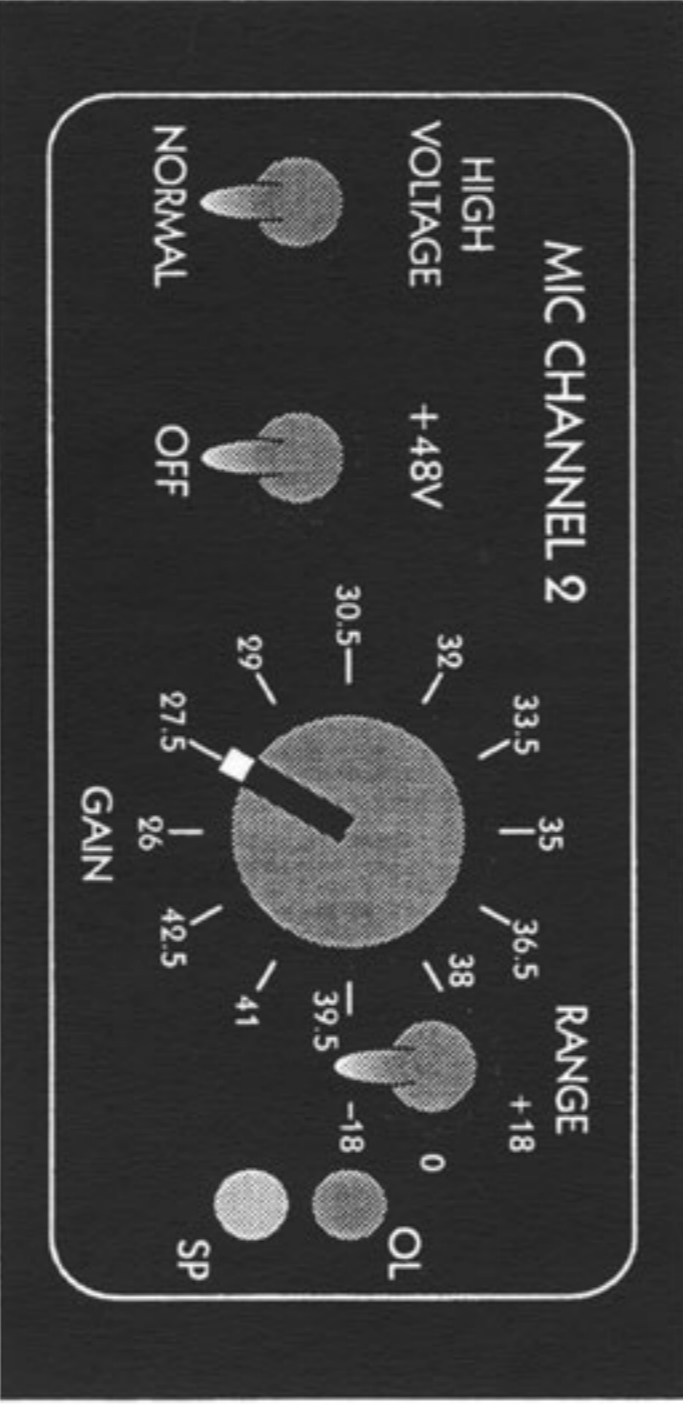
44, 45.5, 47, 48.5, 50, 51.5, 53, 54.5, 56, 57.5, 59, 60.5

### (4) SIGNAL INDICATORS "OL" & "SP" LEDs

The red LED "OL" indicator has been factory set to illuminate when the output reaches a level of +24 dBu. However, the HV-3B can produce unclipped, undistorted levels *over twice this voltage*. As such, the overload LED is *not* an indication of preamp clipping. Rather, it is a general reference showing a nominal peak level. If clipping is occurring in your recording path, check all devices connected after the HV-3B and reduce system gains accordingly. In the event that B&K 4004 or 4012 microphones are used with hazardous sound pressures (over 145 dB SPL) an attenuator may be required between microphone and HV-3B. B&K 4004 and 4012 microphones will handle nearly 170 dB SPL without clipping (>140 dB dynamic range).



# HV-3B Front Panel Diagram



3a

Detail of High-Resolution Gain Switch Option

### (5) "DC POWER" SUPPLY INDICATORS "+50, +130, +25, -25"

Instead of the singular pilot light found on most professional audio devices, the HV-3B has multiple green LED indicators showing status of all main DC power rails (+130V, +50V, +/-25V) and each is indicated by green illumination. If none of the green LEDs are illuminated, it probably means A/C power is not active (check fuse, IEC plug, line-power, A/C power switch, etc). If only one of the green LEDs fails to illuminate, chances are that A/C-power is normal but one of the DC supplies is inoperative. On HV-3B units without the B&K High Voltage option, the +130V LED does not illuminate.

### (6) "AC POWER" SWITCH

Main A/C power switch. With this switch in the down position, all power to the HV-3B is disabled. With this switch in the up position, all DC power supplies are operative.

## REAR PANEL FUNCTIONS

### (1) HIGH VOLTAGE MICROPHONE INPUTS "HV IN" (Optional)

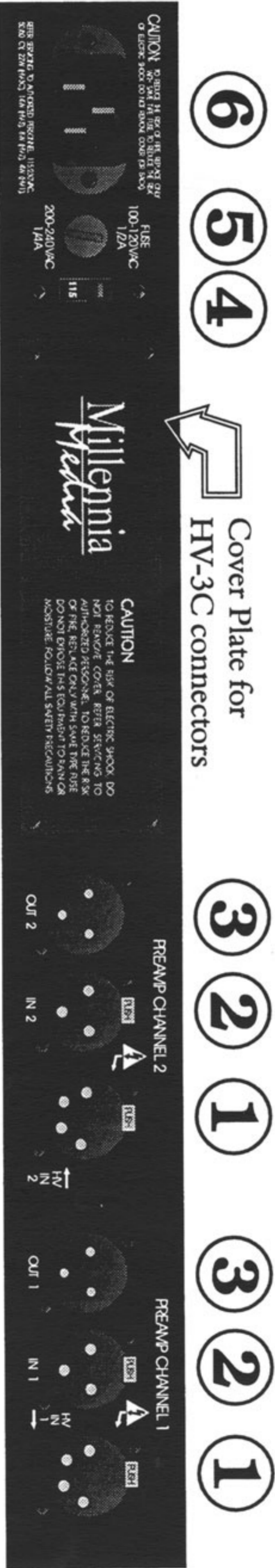
A four pin XLR (female) connector for use only with B&K models 4003, 4004, 4009, and 4012 microphones. On HV-3B units without this option, a black plate will cover the two rear panel XLR holes. Pin 1 is ground, pin 2 is not connected, pin 3 is +130VDC power, and pin 4 is unbalanced audio signal. Connecting anything other than the above listed B&K models to this connector may result in serious damage to microphone, HV-3B unit, or both. Connector contacts are Neutrik Galvatronic gold plated. It is suggested that XLR cable connectors used with the HV-3B employ identical plating.

### (2) CONVENTIONAL MICROPHONE INPUTS "MIC IN"

A three pin XLR (female) connector for use with all conventional balanced microphones, both phantom and non-phantom powered. Pin 1 is ground, pin 2 is positive polarity, and pin 3 is negative polarity. Connector contacts are Neutrik Galvatronic gold plated. It is suggested that XLR cable connectors used with the HV-3B employ identical plating.

### (3) LINE LEVEL OUTPUTS "LINE OUT"

A three pin XLR (male) connector providing balanced, line level microphone output. Pin 1 is ground, pin 2 is positive polarity, and pin 3 is negative polarity. The line-level output is capable of driving 600 ohm loads and long, high capacitance cables. Connector contacts are Neutrik Galvatronic gold plated. It is suggested that XLR cable connectors used with the HV-3B employ identical plating.



# HV-3B Rear Panel Diagram

#### (4) VOLTAGE SELECTION SWITCH “AC MAINS SELECT”

This switch selects the A/C line voltage to which the HV-3B will be connected. In the USA, the HV-3C is shipped with this switch set to 115VAC. If the HV-3B is used with line voltages between 200 and 240VAC, set this switch to 230VAC. Whenever the switch is changed, always check to assure that the fuse (item #13) is changed to correspond with the correct line voltage. For 100V operation (Japan, etc.), set this switch to 115V. The proper voltage setting is printed on the switch and only one setting is visible when active.

#### (5) A/C POWER FUSE “FUSE”

Use a ½ amp slow-blow ¼” x 1-¼” type MDL or equivalent U/L listed fuse with line voltages between 100 and 120VAC. Use an equivalent ¼ amp slow-blow fuse with line voltages between 200 and 240VAC. If this fuse becomes blown, replace only with a similar type and value of U/L listed fuse. If the fuse blows repeatedly, refer servicing to Millennia Media or a Millennia-authorized service center. The fuse must also be changed if the voltage selection switch (item #12) has been changed.

#### (6) A/C POWER CORD INPUT RECEPTACLE

An IEC-type A/C line-power receptacle for use with removable cords. Use only the power cord provided with the HV-3B unit or equivalent U/L approved type SV, SVT, SJ, or SJT A/C power supply cord. This IEC line-power receptacle employs an integral RFI line filter which attenuates high frequency power line emissions by up to 50dB.

## A WORD ABOUT B&K MICROPHONES

At present, Brüel & Kjær of Denmark manufactures two families of 4000-series professional recording microphones. One family is +48VDC phantom powered, the other is +130VDC direct powered. A primary difference between families (4003/4 vs. 4006/7) is that the high voltage microphones are transformerless whereas the phantom powered varieties are transformer coupled. Millennium Media has used both varieties extensively with symphony orchestra, choir, jazz ensemble, pop recording, and so forth. We have found the transformerless high voltage omni version to perform substantially better than its transformer-coupled counterpart. The transformerless version (4003) sounds generally “clearer” and more true to the source — *especially* during frequency and amplitude extensions. And this is saying a lot considering that B&K’s transformer-coupled microphones sound extremely pure.

The following is a brief summary of B&K high-voltage microphone products and specifications. Most of this material is taken directly from Brüel & Kjær documentation and is thought to be accurate, however, Millennium Media assumes no responsibility for errors or subsequent changes in the following specifications. Those desiring up-to-date information concerning B&K high voltage microphones should contact B&K directly.

	4003	4004	4012
PATTERN	Omni	Omni	Cardioid
SELF-NOISE	15 dB(a)	24 dB(a)	19 dB(a)
SPL (MAX)	154 dB SPL	168 dB SPL	168 dB SPL
FREQ (-3dB)	8Hz-30kHz	8Hz-45kHz	35Hz-25kHz
IMPEDANCE	<30 ohms	<30 ohms	<30 ohms
SENSITIVITY	50mV/Pa	10mV/Pa	9mV/Pa

A number of options are available for the 4003 microphone. One grid, the 0777, provides superior omnidirectional response throughout the high frequencies. Another grid, the 0297, provides a high frequency presence boost. The standard grid provides the most accurate response on-axis. A development called acoustic pressure equalizers (APEs) tailor the 4003 to respond like vintage Neumann M-50 or newer TLM-50 microphones. The various APE attachments boost mid to high frequencies arriving on-axis without exhibiting proximity effect at lower frequencies. When used with the various grids, many polar patterns and responses can be achieved.

At additional cost, Brüel & Kjær offers a service of factory-matching new pairs of microphones for tight stereo tracking of sensitivity and frequency response. Millennium Media highly recommends this service. The HV-3 preamp maintains razor flat, stereo-matched frequency response and less than 1/2 degree of stereo phase error — a perfect complement to a factory-matched pair of B&K microphones.

At this time, the 4-pin XLR (female) receptacles found on the Millennium Media model HV-3 are intended for use *only* with B&K model 4003, 4004, 4009, and 4012 microphones and approved cable types. *Do not attempt to connect any other device or cable into these 4-pin XLR (female) receptacles.* Connecting anything other than the above specified B&K microphones into the 4-pin XLR receptacles may result in serious damage. To assure safe operation and accurate sonics, it is recommended that Millennium high voltage cables be used.

## PREAMPLIFIER SPECIFICATIONS

Minimum Gain	8 dB
Maximum Gain	65 dB (higher gain available)
Frequency Response	Usable 1 Hz to beyond 500 kHz 10 Hz - 100 kHz, +0/-15 dB
Noise (0 ohm source)	-73 dB @ 60 dB gain (-133 dB EIN)
(30 ohm source)	-71 dB @ 60 dB gain (-131 dB EIN)
(150 ohm source)	-68 dB @ 60 dB gain (-128 dB EIN)
THD + Noise, 20 Hz - 20 kHz	<.002% @ 35dB gain, +27dBu out, 10 Hz - 80 kHz Bandwidth
THD + Noise, 20 Hz - 20 kHz	<.0009% @ 35dB gain, +27dBu out, <.0005% typ., 22 kHz Bandwidth
Stereo Phase Coherency	<1/2 degree, 20 Hz - 40 kHz
Phase vs. Frequency, either channel	<2 degrees, 50 Hz - 15 kHz
Common Mode Rejection Ratio	>72 dB @ 35 dB gain, 100mV, to 20 kHz >85 dB typical
Slew Rate	>25V per microsecond
Stereo (Interchannel) Crosstalk	Better than -120 dB @ 1kHz (>20 bits)
Input Level, onset of clipping	+23 dBu, 10 Hz - 20 kHz (at 8 dB gain)
Output Level, onset of clipping	+32 dBu, 10 Hz - 20 kHz
Input Impedance	6,700 ohms @ 1 kHz
Output Impedance	24.3 ohms (x2)
XLR Polarity (3-pin types, only)	Pin 2 positive polarity, Pin 1 = ground
B&K XLRs (4-pin types, only)	Pin 1 = ground, Pin 2 = n/c Pin 3 = +130 VDC (limited to 7mA) Pin 4 = unbalanced audio

## ELECTRO-MECHANICAL SPECIFICATIONS

Power Consumption	12 Watts, maximum
Power Requirements	115VAC or 230VAC, 50/60Hz, switched
Fuse	1/2 amp, 115VAC (slow-blow) 1/4 amp, 230VAC (slow-blow)
Internal DC Power	+130V, +50V, +25V, -25V
Dimensions	19" W x 12.5" D x 1.7" H
Net Weight	12 pounds

Millennia Media reserves the right to change specifications and delivery without notice.

# HV-3B LIMITED WARRANTY

Millennia Media will at its discretion repair or replace this product, free of charge, in the USA, in the event of defect in materials or workmanship for one (1) year following date of purchase. This warranty is extended only to the original purchaser. This limited warranty covers failures due only to defects in materials and workmanship which occur during normal, intended use and does not cover damage which occurs in shipment or failures which are caused by products not supplied by Millennia Media. This limited warranty does not cover failures which arise from accident, misuse, abuse, neglect, mishandling, misapplication, faulty installation, improper adjustment, alteration or modification of product, line-power surges, acts of God, or service performed by anyone other than Millennia Media or its authorized agent.

## LIMITS AND EXCLUSIONS

There are no express warranties except as listed above. Millennia Media shall not be liable for special, subsequent, incidental, consequential, or punitive damages, including, but not limited to: damage to recordings, microphones, or any associated equipment, downtime costs, loss of goodwill, or claims of any party dealing with purchaser for such damages resulting from the use of this product. All warranties, express and implied, including the warranties of merchantability and fitness for a particular purpose are limited to the applicable warranty period set forth above.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or length of time an implied warranty remains in effect. As such, the above exclusions may not apply. This warranty gives you specific legal rights and you may also have other rights which can vary from state to state.

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The HV-3B is made in USA  
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