

# READ THIS FIRST!

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

1. Copyright: You acknowledge that no title to the intellectual property in the M-2b is transferred to you.
2. Inspection: Inspect packing boxes, M-2b, and cables for damage, unusual marks, or shortages. It is your responsibility to report damage, shortage, or misshipments in a timely manner. Millennium 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 10 days after ship date.
3. Read this manual carefully and completely before attempting to use the M-2b. Improper operation could result in damage to product. It is the user's responsibility to understand the safe use and operation of this device.
4. The shipping box of the M-2b system will include (1) Owner's Manual, (2) M-2b, (3) a UL approved power cord, (4) Owner's Registration Card. Fill out the Owner's Registration Card and return to Millennium Media at your earliest ability.

The material contained in this manual consists of information that is property of Millennium Media, Inc. and is intended solely for use by the purchasers of the equipment described in this manual. Millennium 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 Millennium Media, Inc.. Under copyright laws, this manual may not be duplicated in whole or in part without the written consent of Millennium Media, Inc..

*M-2b* is a trademark of Millennium Media, Inc. All other trademarks are property of their respective holders. Serial numbers are located on the rear left side of each unit. We suggest that you record the serial numbers in the space provided below. Refer to it whenever you call an authorized Millennium 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 Nos. \_\_\_\_\_

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

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

*M-2b*

**Millennia**  
*Media*<sup>®</sup>

# 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 M-2b. **WARNING: *The M-2b internal circuitry carries lethal voltages.*** Carefully observe all warnings, precautions, and instructions on the M-2b and as described in the instructions supplied with the unit.

## 1. WATER, MOISTURE, AND SPILLAGE

Do not attempt to use the M-2b 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 M-2b unit.

## 2. HEAT AND VENTILATION

Be sure to allow adequate ventilation to M-2b 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

The M-2b Power Supply should be connected to a power source only of the type described in the operating instructions or as marked on the Power Supply. 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 AC power cord exits the M-2b.

## 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 any M-2b 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

**Lethal voltages are found inside the M-2b chassis.** The user should not attempt to repair or service this unit. All servicing and/or repairs should be referred to Millennia Media.

If, after reading all instructions, precautions, and warnings, you have remaining questions, please contact Millennia Media directly before attempting to use your M-2b. Retain this owner's manual as a record of your purchase to aid positive identification in the event of loss.

# QUICK START!

*READ THIS!! The M-2b operates with lethal operating voltages -- the voltage inside the M-2b can kill you. Never, under any circumstances, remove the top cover. Refer to a qualified electronics technician any and all servicing, tube replacement, and other operations which require the top cover to be removed.*

Congratulations on your purchase of the Millennia Media M-2b vacuum tube microphone preamplifier. The M-2b is the result of meticulous listening tests on numerous circuit, topology, and packaging designs. Your M-2b is a finely tuned instrument intended for critical professional applications — we feel it offers the world's most elegant vacuum tube mic preamplification. With the emergence of 24+ bit digital audio, recording engineers are faced with a new requirement for undistorted dynamic range. The M-2b meets this challenge exceptionally well.

Before connecting power to the M-2b, assure that the rear panel voltage selection fuse block switch is set correctly. In the USA, the M-2b is shipped with the voltage selection block set to 100-120 VAC. At this voltage setting, a pair of 1 amp 5 x 20 mm slow blow fuses have been factory installed. If you change the voltage selection block to 200-240 VAC usage, be sure to change both fuses to 500 milliamp (0.5 amp) slow blow types.

The M-2b enclosure measures 19" wide x 3.5" high x 13.75" deep and is designed for mounting into a standard 2U, 19" equipment rack. If the M-2b is mounted into a road case or other rack which is prone to strong vibration or shock, it is recommended that the rear of the M-2b be supported or otherwise reinforced to withstand such conditions. The M-2b requires adequate ventilation. To assure proper air circulation and operation, leave at least one rack screw space open above the M-2b chassis.

The M-2b is designed on a common ground topology. For high quality operation, and for your own safety and the safety of others, do not defeat the purpose of the earth grounding pin on the A/C power cord!

## NOTE:

The M-2b is based on pure Class-A all vacuum tube design. Such topology performs best after reaching a stable, warmed-up condition. All M-2b factory adjustments have been performed when unit is fully warmed-up; at least one-half hour after turning unit on. It is recommended that to achieve optimal sonic performance with the M-2b, allow a warm-up period of at least one-half hour.

## M-2b REAR PANEL

### (1) CONVENTIONAL (+48V) INPUTS "In 1 (Left), In 2 (Right)"

Conventional 3-pin female XLR input jacks for all balanced microphones. Pin 1 is chassis ground, pin 2 is positive phase audio signal, pin 3 is negative phase audio signal. Input impedance is 3,800 ohms.

### (2) DPA (B&K) HIGH VOLTAGE (+130V) INPUTS — *optional*

Conventional 4-pin female XLR input jacks for use only with B&K 4000-series high voltage audio microphones. Pin 1 is chassis ground, pin 2 is unused, pin 3 is +130VDC, pin 4 is audio signal. Input impedance is 9,000 ohms.

### (3) OUTPUTS "Out 1 (Left), Out 2 (Right)"

Conventional 3-pin male XLR unbalanced outputs. Pin 1 is chassis ground, pin 2 is positive phase audio signal, and pin 3 is audio ground. Output impedance is 120 ohms.

### (4) EARTH/AUDIO GROUND JUMPER

A barrier terminal which ties earth ground to audio ground. If ground "hum" loops are experienced when using the M-2b, removing this jumper may help. Removing this jumper will not compromise chassis/earth ground integrity.

### (5) AC VOLTAGE MAINS SELECTION "100-120" or "200-240"

A power entry module with a removable fuse holder block. This fuse holder block is selectable for 100 to 120 Volt or 200 to 240 Volt worldwide mains powering. The fuse block contains two fuses — one fuse is in series with the hot power line while the other fuse is in series with the neutral power line. Both fuses *must* be installed. To change the mains voltage selection, remove IEC power connector and *assure that the M-2b is not connected to mains power*. With a non-conductive tool, gently pry the fuse block away from the power entry module. Remove the two fuses and replace both with type as shown below. Slide out the internal PC Board assy, turn it over, and reinsert the PCB assy so that the desired AC mains voltage appears in the viewing window. Double check that the fuses installed correspond to the AC mains voltage range which appears in the viewing window. Gently push the fuse block back until flush and snug.

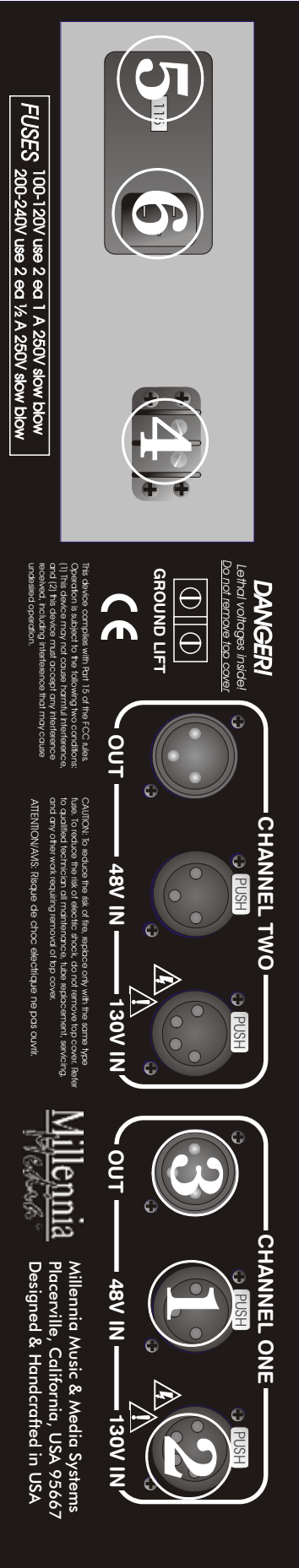
#### FUSES:

For 100-120 VAC mains, use 5x20mm, 1A, slow blow, 250V, Littelfuse 218 or equivalent.

For 200-240 VAC mains, use 5x20mm, 500mA, slow blow, 250V, Littelfuse 218 or equivalent.

### (6) POWER ENTRY "IEC Power Receptacle"

An IEC-type AC line-power receptacle for use with removable cords. Use only the power cord provided with the M-2b unit or equivalent U/L approved type SV, SVT, SJ, or SJT AC power supply cord. *Do not defeat the third pin earth ground!* If ground lifting is desired, remove the Earth/Audio Ground Jumper strap (3).



# M-2b Rear Panel

## M-2b FRONT PANEL

### (1) GAIN TRIM "GAIN TRIM 0 - 12 dB"

Conductive plastic rotary potentiometer offering a gain trim range of 12 dB. Working in concert with range switches (2) and (3) below, the Gain Trim allows fine adjustment of microphone gain. When fully CCW, there is no additional gain added (0 dB). When fully CW, an additional gain of approximately 12 dB is realized.

### (2) MEDIUM RANGE SWITCH ("MEDIUM GAIN RANGE")

The first of two pushbutton switches used to select the gain range of the M-2b preamplifier. See below (3) for complete description.

### (3) HIGH RANGE SWITCH ("HIGH GAIN RANGE")

The second of two pushbutton switches (2) and (3) used to select the gain range of the M-2b preamplifier. These two pushbutton switches define three preamplifier gain ranges, as follows:

a.) LOW RANGE: When both switches (2) and (3) are *not* depressed and corresponding LEDs are not illuminated, microphone preamplifier is set to "Low Gain Range." Low Gain Range is defined as approximately 14 dB to 26 dB, adjustable by the Gain Trim control (1) above.

b.) MEDIUM RANGE: When switch (2) is depressed and switch (3) is *not* depressed, microphone preamplifier is set to "Medium Gain Range." Medium Gain Range is defined as approximately 26 dB to 38 dB, adjustable by the Gain Trim control (1) above.

c.) HIGH RANGE: When switches (2) and (3) are *both* depressed and corresponding LEDs are both illuminated, microphone preamplifier is set to "High Gain Range." High Gain Range is defined as approximately 38 dB to 50 dB, adjustable by the Gain Trim control (1) above.

### (4) HIGH VOLTAGE DPA (B&K) MIC INPUT SELECT "+130V"

Routes the optional DPA (Bruel & Kjaer) microphone input to the microphone preamplifier. High voltage supply is not effected by this switch (e.g., the +130 VDC supply is always present on pin 3 of the optional four pin mic input XLR irrespective of where this switch is set).

### (5) PHANTOM POWER SELECT "+48V"

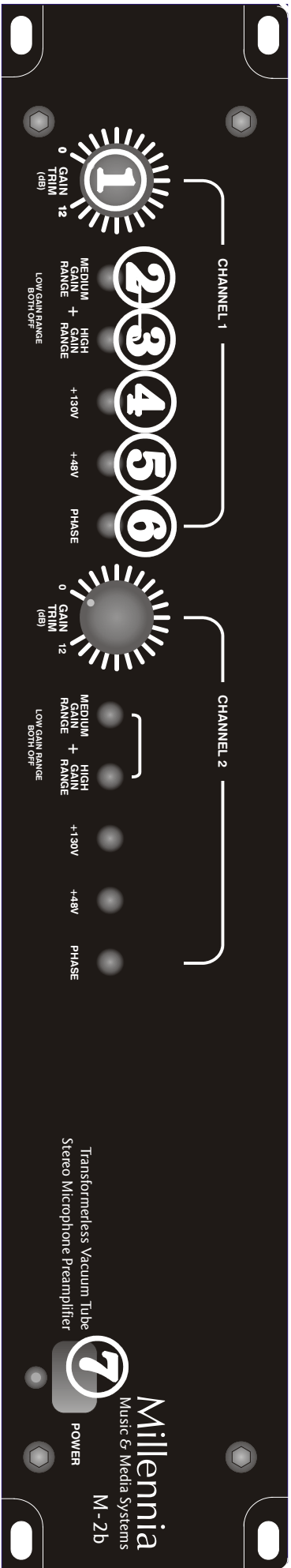
Routes +48 VDC "phantom" voltage to the 3-pin XLR microphone inputs for use with all conventional phantom powered microphones. If "DC Option" has been installed, and this switch is not depressed, the conventional front end becomes entirely DC coupled — an ideal match for ribbon mics, moving coil mics, and so forth.

### (6) POLARITY REVERSE "PHASE"

Pushbutton switch which, when depressed and corresponding LED is illuminated, flips the microphone polarity (output becomes 180 degrees out of phase with respect to the input). When switch is not depressed, microphone signal remains in phase from input to output.

### (7) POWER SWITCH "POWER"

Rocker switch for switching AC line power on and off.



# M-2b Front Panel

## A WORD ABOUT DPA (Brüel & Kjær) MICROPHONES

At present, Danish Pro Audio (formerly Brüel & Kjær Pro Audio Division) manufactures two families of 4000-series professional recording microphones. One family is +48 VDC phantom powered, the other is +130 VDC direct powered. A primary difference between families (4003/4 vs. 4006/7) is that the high voltage microphones are transformer-less whereas the phantom powered varieties are transformer coupled. Millennia 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 omni 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 DPA's transformer-coupled microphones sound extremely pure.

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

| Model         | 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 Response | 8 Hz - 30 kHz | 8 Hz - 45 kHz | 35 Hz - 25 kHz |
| Impedance     | < 30 ohms     | < 30 ohms     | < 30 ohms      |
| Sensitivity   | 50mV / Pa     | 10 mV / Pa    | 9 mV / Pa      |

A number of options are available for the 4003 microphone. One grid, the 0777, provides superior omni-directional 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 the APE (acoustic pressure equalizer) tailors the 4003 to respond like vintage 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 various grids, numerous polar patterns and response curves can be achieved.

DPA offers a service of factory-matching new pairs of high voltage (+130 VDC) microphones for tight stereo tracking of sensitivity and frequency response curves. Millennia Media highly recommends this service and can assist customers in obtaining these microphones. A high voltage microphone preamplifier upgrade is available for your M-2b at any time. Please call the factory for details.



## M-2b TYPICAL MEASURED SPECIFICATIONS

|                                       |  |
|---------------------------------------|--|
| THD + Noise, 22 Hz - 22 kHz           | < .01% @ +0 dBu  |
| Frequency Response (-3 dB points)     | 4 Hz to 200 kHz  |
| Maximum Input Level (+14 dB gain)     | +20 dBu  |
| Maximum Output Level                  | > +35 dBu  |
| Input Impedance                       | 3,800 ohms (conventional mic input)<br>9,000 ohms (high voltage mic input)           |
| Output Impedance                      | 120 ohms   |
| Recommended Load ( <i>important</i> ) | > 2,000 ohms   |
| Noise (22 Hz - 22 kHz @ 50 dB gain)   | -116 dBu EIN, 150 ohm source   |
| Common Mode Rejection Ratio           | > 80 dB, 100mV @ 1 kHz   |
| XLR Polarity                          | Pin 2 positive polarity, Pin 1 = ground  |
| Gain Ranging (approximate)            | Low Range: 14 dB - 26 dB<br>Medium Range: 26 dB - 38 dB<br>High Range: 38 dB - 50 dB |
| Phase Reverse Switching?              | Yes  |
| Phantom Switching?                    | Yes  |
| DPA (B&K) Switching?                  | Yes, optional  |
| Gain Range Switching?                 | Yes, 3 ranges  |
| Gain Adjustment                       | Conductive Plastic Rotary Potentiometer  |

## ELECTRO-MECHANICAL SPECIFICATIONS

|                    |   |
|--------------------|---|
| Power Consumption  | 50 Watts, nominal   |
| Power Requirements | 100VAC to 240VAC, 50/60Hz, selectable   |
| Fuses (2 required) | 2 ea 1A with 100-120VAC mains (5x20mm, slow-blow, 250V)<br>2 ea 500mA with 200-240V mains (5x20mm, slow-blow, 250V) |
| Internal DC Power  | +350V, +130V, +48V, -24V, +12V  |
| Dimensions         | 19" W x 13.75" D x 3.5" H   |
| Net Weight         | 24 pounds   |

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

## WARRANTY

Millennia Media will repair this product, free of charge, in the USA, in the event of defect of 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, incompatibilities, line-power surges, acts of God, or service performed by anyone other than Millennia Media or its authorized agent. Vacuum tube failures are not covered under warranty.

## 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, mixing consoles, 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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