Model 2-610 / M610

Microphone Preamplifier

Universal Audio Part Number 65-0008

Revision 1.1

Universal Audio, Inc.
www.uaudio.com
PO Box 3800
Santa Cruz, CA 95063-3818
(831) 466-3737 voice
(831) 466-3775 fax
www.uaudio.com

The 2-610 & M610 Microphone Preamplifier

Thank you for purchasing the "610" Vacuum Tube Microphone Preamplifier, the first original analog design from the new Universal Audio. The 2-610 was inspired by the microphone preamp section of the 610 console designed by my father, M.T. "Bill" Putnam, in the 1950s. The 610 was a rotary-control console and was the first console of the modular design. Although technologically simple compared to modern consoles, the 610 possessed a warmth and character that kept it in demand for decades. As a prominent part of my father's United/Western studios, the 610 was used on many classic recordings by Frank Sinatra and Sarah Vaughan. The Beach Boys *Pet Sounds*, the Doors *LA Woman*, and Van Halen's debut album were all recorded on the 610. The legendary Wally Heider used the 610 in his remote truck for many of his best-known live recordings. At Ocean Way Studios (formerly United), the 610 is lovingly preserved and still used in Studio B.

The M610 is a mono version of the 2-610 with a simplified EQ section. Other than that, the sound and features are identical to the 2-610. Please refer to the Table Of Contents for information about the unique M610 EQ section. The following text is generic information about the 2-610. These comments are true for the M610 as well.

Most of us at Universal Audio are musicians, recording engineers, or both, and we wanted to build a mic preamp that we'd be delighted to use ourselves. We love the recording process, and we really get inspired when the basic tracks are beautifully recorded. Our design goal for the 2-610 was to capture the original character of the 610, creating a preamp that would induce that "a-ha" feeling we've felt when hearing music recorded in its most natural, pristine form.

The controls on the 2-610 are simple and essential: we added only those features required for practical use without needless duplication of functionality found elsewhere in most studios. The transformers and tubes received much of our R&D attention. We settled on a transformer design featuring double-sized alloy cores with custom windings. Our tubes are carefully selected and tested individually. This extra effort is well worth the time and cost because the result is a truly outstanding, easy-to-use mic preamp!

In addition to the 2-610 and M610, Universal Audio has recently released reproductions of the 1176LN Limiting Amplifier, (another of my father's designs) and the classic Teletronix LA-2A Leveling Amplifier. We plan to offer additional original designs, vintage reproductions, and digital products that meet the demands of the modern recording studio, yet retain the character of vintage equipment.

These products have been quite an enjoyable adventure to develop and we're sure the next phase will be even more fun! We thank you for your support and we thank my father, Bill Putnam.

Thank you,

Bill Putnam

IMPORTANT SAFETY INSTRUCTIONS

Before using this unit, be sure to carefully read the applicable items of these operating instructions and the safety suggestions. Afterwards keep them handy for future reference. Take special care to follow the warnings indicated on the unit itself, as well as in the operating instructions.

Water and Moisture – Do not use the unit near any source of water or in excessively moist environments.

Object and Liquid Entry – Care should be taken so that objects do not fall, and liquids are not spilled, into the enclosure through openings.

Ventilation – When installing the unit in a rack or any other location, be sure there is adequate ventilation. Improper ventilation will cause overheating, and can damage the unit.

Heat – The unit should be situated away from heat sources, or other equipment that produces heat.

Power Sources – The unit should be connected to a power supply only of the type described in the operating instructions, or as marked on the unit.

Power Cord Protection – AC power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords at plugs, convenience receptacles, and the point where they exit from the unit. Never take hold of the plug or cord if your hand is wet. Always grasp the plug body when connecting or disconnecting it.

Grounding of the Plug – This unit is equipped with a 3-wire grounding type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.

Carts and Stands – The unit should be used only with a cart or stand that is recommended by the manufacturer. The unit and cart combination should be moved with care. Quick stops, excessive force and uneven surfaces may cause the unit and cart combination to overturn.

Wall Or Ceiling Mount – The unit should be mounted to a wall or ceiling only as recommended by the manufacturer.

Cleaning – The unit should be cleaned only as recommended by the manufacturer.

Nonuse Periods – The AC power supply cord of the unit should be unplugged from the AC outlet when left unused for a long period of time.

Damage Requiring Service – The unit should be serviced by qualified service personnel when:

- The AC power supply cord or the plug has been damaged;
- Objects have fallen or liquid has been spilled into the unit;
- The unit has been exposed to rain;
- The unit does not operate normally or exhibits a marked change in performance;
- The unit has been dropped, or the enclosure damaged.

Servicing – The user should not attempt to service the unit beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.

Notice

This manual provides general information, preparation for use, installation and operating instructions for the Universal Audio 2-610 and the M610 Microphone Preamplifier.

The information contained in this manual is subject to change without notice. Universal Audio, Inc. makes no warranties of any kind with regard to this manual, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Universal Audio, Inc. shall not be liable for errors contained herein or direct, indirect, special, incidental, or consequential damages in connection with the furnishing, performance, or use of this material.

Copyright

Trademarks

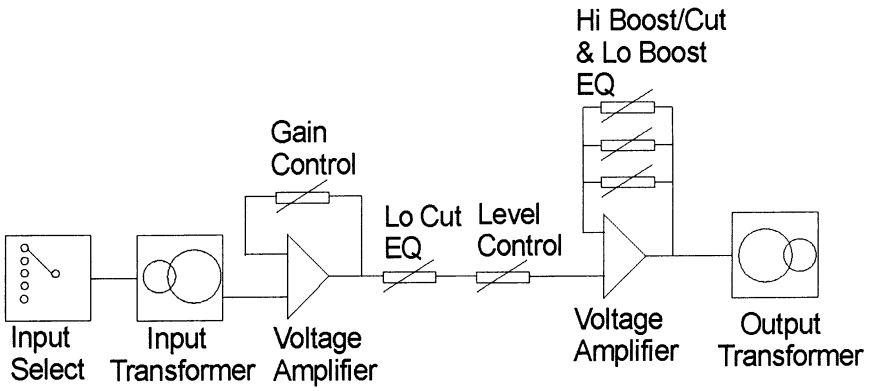
LA-2A, 1176, 2-610, M610 and the Universal Audio, Inc. logo are trademarks of Universal Audio, Inc. Other company and product names mentioned herein are trademarks of their respective companies.

Table of Contents

2-610/M610 Specifications

Microphone Input Impedance	Selectable, 500 Ω or 2 kΩ
Balanced Line Input Impedance	13.8 kΩ
Hi-Z Input Impedance	Selectable between 2.2 MΩ or 47 kΩ
Maximum Microphone Input Level	+3.5 dBu
Maximum Output Level	+20 dBm
Internal Output Impedance	60 Ω
Recommended Minimum Load	600 Ω
Frequency Response	20 Hz to 20 kHz ±1 dB
Maximum Gain	61 dB
Signal-to-Noise Ratio	> 82 dB
Tube Complement	One 12AX7A and one 6072A per channel
Power Requirements	115V/230V
Dimensions	3.5" vertical, for mounting in standard 19" rack
2-610 Weight	11.75 lb.
M610 Weight	10.05 lb.

2-610/M610 Block Diagram



2-610 Operating Instructions

The 2-610 is a two-channel, vacuum-tube microphone/instrument/line preamplifier. Each channel has two gain stages that each utilize a dual-triode tube operating in a class A single-ended configuration. Variable negative feedback is applied to both of these stages to control gain, distortion, and frequency response. Balanced inputs and outputs are transformer coupled.

2-610 Front Panel

The front panel has two identical channels (Figure 1) each with Input Select, Gain, Level, EQ, and Polarity controls as well as a Hi-Z Input. The center section between the channels (Figure 2) has the Power On/Off switch and light and a 48 V phantom power On/Off switch for each channel. Each control is discussed in the following sections.

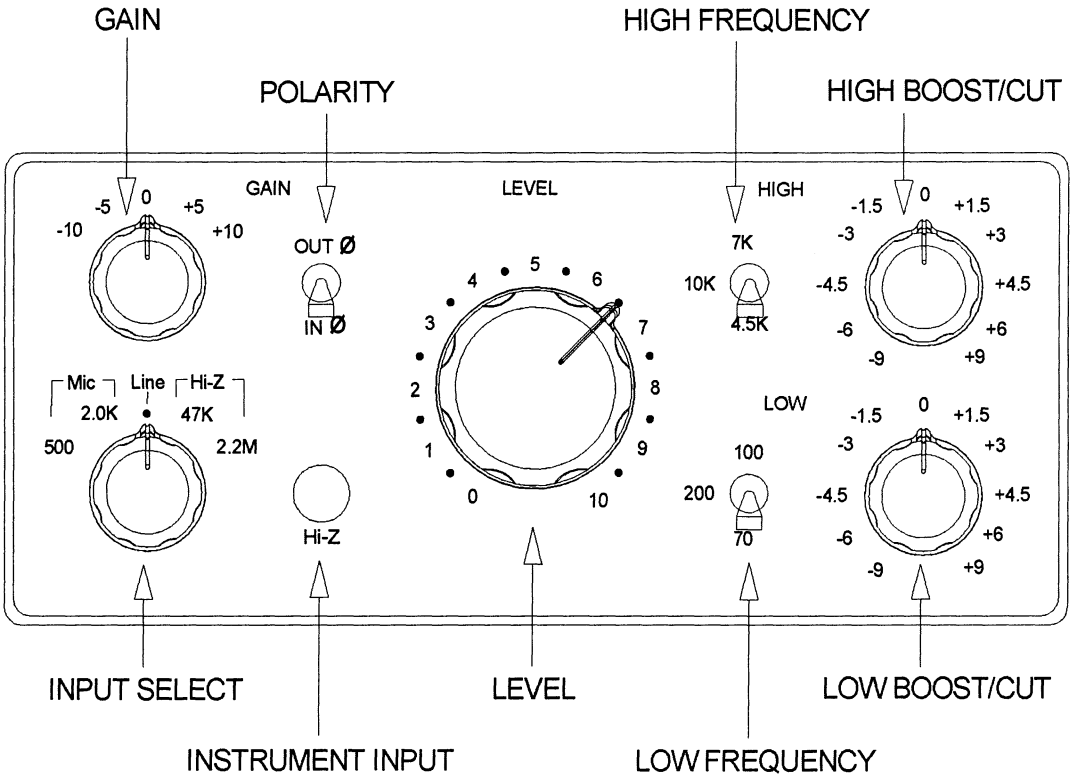


Figure 1: 2-610 front panel overlay

Input Select

The Input Select switch determines which input is active: Mic, Line, or Hi-Z. Within both the Mic and Hi-Z areas, the switch includes two settings to select between input impedances.

- Mic: Selects the signal from the rear-panel, balanced, **MIC INPUT** XLR connector. The impedance for the **MIC INPUT** can be set to **500Ω** or **2KΩ**. Switching between these two positions while listening to a connected microphone may reveal a different tonal quality and/or gain. A typical mic preamplifier should have an input impedance equal to about 10 times the mic output impedance. For example, if your mic has an output impedance between 150 Ω and 200 Ω, set the switch to the **2K** position. However, since making music is not necessarily about adhering to technical specifications, feel free to experiment with the settings to attain the desired sound. You will not harm your microphone or the 2-610.

- Line: Selects the signal from the rear-panel, balanced, **LINE INPUT** XLR connector. **LINE INPUT** has an input impedance of approximately 13 kΩ and is intended to accommodate mixers, tape machines, other mic preamps or any device with a line level output, such as keyboards, sound modules and drum machines. The 2-610 may be used as a "tone box" in this configuration, offering a variety of sonic colors based on the front panel control settings.

- Hi-Z: Selects the signal from the front panel, unbalanced Hi-Z 1/4"connector. This input can have an input impedance of **47KΩ** or **2.2 MΩ** and is intended for bass, guitar or any instrument with a magnetic or acoustic transducer pickup. The **47KΩ** setting is best suited for -10 dBv level signals, typically found on active basses and guitars. The **2.2MΩ** setting is appropriate for instruments with passive pickup systems. Since an instrument's output impedance may be somewhere between the active and passive levels, feel free to experiment to achieve the best sound at the desired level.

Gain

The Gain control adjusts the gain of the input stage in 5 dB increments. Turning the switch clockwise reduces the negative feedback, which raises the gain. In addition to changing the volume, the Gain control also alters the amount of the tube's harmonic distortion, a major contribution to the warm sound characteristic of tube equipment.

Level

The Level knob is the master volume control. It determines the amount of signal from the preamplifier gain stage sent to the output stage. The cleanest signal is attained by setting the Level knob between 7 and 10 on the scale, then turning the Gain knob until the desired level is attained. Altering the Gain, Impedance, and Output controls together provides many useful tonal variations. The numeric values on the front panel for the Level control denote magnatude and are NOT specific dB values.

Polarity

The front panel toggle switch labeled **IN Ø** and **OUT Ø** determines the polarity of the LINE OUTPUT.

When **IN Ø** is selected, pin 2 is hot (positive). When **OUT Ø** is selected, pin 3 is hot (positive).

EQ Controls

The 2-610 has both low and high frequency shelving-type equalizers, each with two controls:

- **Frequency**: This toggle switch selects the corner frequency (Hz). High: 4.5K, 7K, 10K; Low: 70, 100, 200

- **Boost/Cut**: This rotary switch selects the amount of boost or cut applied to the frequency "shelf." The positive and negative numbers on the front panel denote dB values.

+48 V (Phantom Power)

Most modern condenser mics require phantom voltage to operate and we recommend checking the requirements of your microphones before connecting them. It is good practice to keep phantom power off (switch down) when it is not required. To avoid loud transients, always keep the phantom power off when connecting or disconnecting microphones.

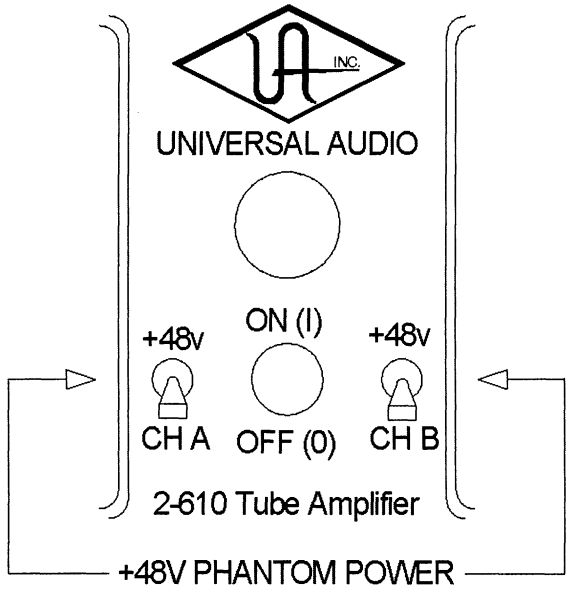


Figure 2: 2-610 front panel center section

Each channel has a toggle switch that applies 48 V to the input jack when the switch is up.

2-610 Rear Panel

The rear panel (Figure 3) has two identical channels each with MIC INPUT, LINE INPUT, and LINE OUTPUT XLR connectors. The center of the rear panel has an AC Power input with a fuse holder and a voltage selector switch. These connectors and controls are discussed in the following sections.

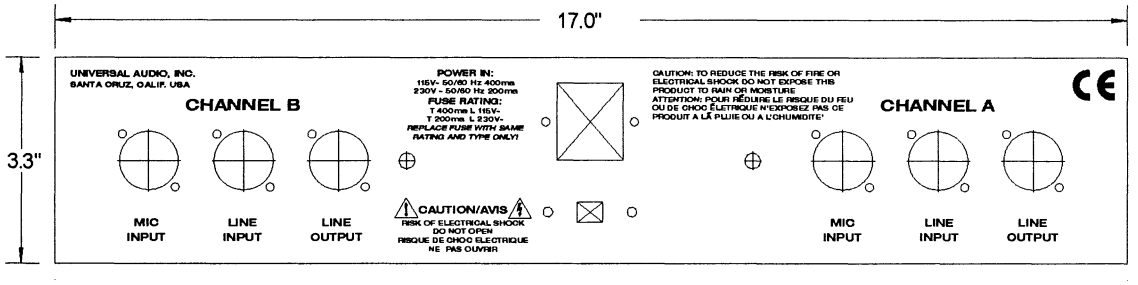


Figure 3: 2-610 rear panel

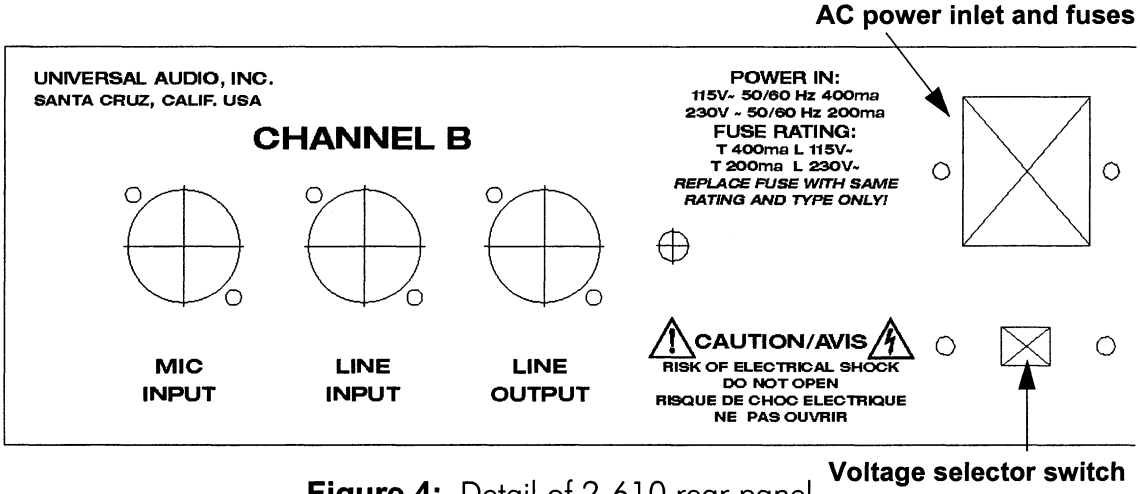


Figure 4: Detail of 2-610 rear panel

Input/Output

Standard XLR input and output connectors are provided on the rear panel. Pin 2 is wired positive (hot) on the LINE and MIC INPUTS. Pin 2 is positive on the LINE OUTPUT when the front panel Polarity toggle switch is down (IN Ø). Pin 3 is positive on the LINE OUTPUT when the front panel Polarity switch is up (OUT Ø).

Voltage Selector Switch

The 2-610 can operate at 115 V or 230 V by sliding the voltage selector switch located below the power cable connector. *Make sure the switch is properly set for the voltage in your area before applying AC power to the unit!*

AC Power

The 2-610 uses a standard, detachable IEC power cable.

Fuse/Mains

The AC power fuse is located in the AC power connector block. Remove the power cord before checking or changing the fuse.

- A 400 mA time delay (slow blow) fuse is required for operation at 115 V.
- A 200 mA time delay (slow blow) fuse is required for operation at 230 V.

M610 Operating Instructions

The M610 is a single channel, vacuum-tube microphone/instrument/line preamplifier. The channel has two gain stages that each utilize a dual-triode tube operating in a class A single-ended configuration. Variable negative feedback is applied to both of these stages to control gain, distortion, and frequency response. Balanced inputs and outputs are transformer coupled.

M610 Front Panel

The left side front panel overlay (Figure 5) contains the basic preamp controls: Input Select, Gain, Level, EQ, and Polarity controls as well as a Hi-Z Input. The right side front panel (Figure 6) contains: Power On/Off switch and light, 48 V phantom power On/Off switch and light. Each control is discussed in the following sections.

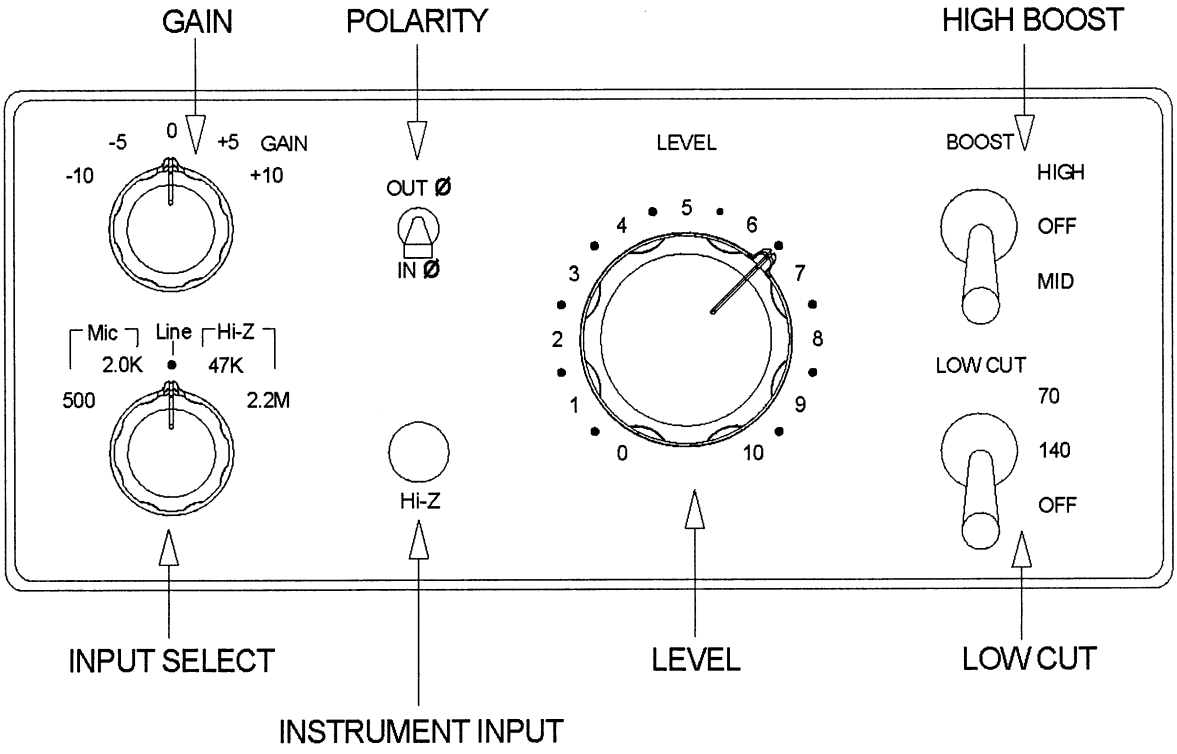


Figure 5: M610 front panel overlay

Input Select

The Input Select switch determines which input is active: Mic, Line, or Hi-Z. Within both the Mic and Hi-Z areas, the switch includes two settings to select between input impedances.

- Mic: Selects the signal from the rear-panel, balanced, MIC INPUT XLR connector. The impedance for the MIC INPUT can be set to 500Ω or 2KΩ. Switching between these two positions while listening to a connected microphone may reveal a different tonal quality and/

or gain. A typical mic preamplifier should have an input impedance equal to about 10 times the mic output impedance. For example, if your mic has an output impedance between 150 Ω and 200 Ω, set the switch to the **2K** position. However, since making music is not necessarily about adhering to technical specifications, feel free to experiment with the settings to attain the desired sound. You will not harm your microphone or the M610.

- **Line**: Selects the signal from the rear-panel, balanced, **LINE INPUT** XLR connector. **LINE INPUT** has an input impedance of approximately 13 kΩ and is intended to accommodate mixers, tape machines, other mic preamps or any device with a line level output, such as keyboards, sound modules and drum machines. The M610 may be used as a "tone box" in this configuration, offering a variety of sonic colors based on the front panel control settings.

- **Hi-Z**: Selects the signal from the front panel, unbalanced Hi-Z 1/4"connector. This input can have an input impedance of **47KΩ** or **2.2 MΩ** and is intended for bass, guitar or any instrument with a magnetic or acoustic transducer pickup. The **47KΩ** setting is best suited for -10 dBv level signals, typically found on active basses and guitars. The **2.2MΩ** setting is appropriate for instruments with passive pickup systems. Since an instrument's output impedance may be somewhere between the active and passive levels, feel free to experiment to achieve the best sound at the desired level.

Gain

The Gain control adjusts the gain of the input stage in 5 dB increments. Turning the switch clockwise reduces the negative feedback, which raises the gain. In addition to changing the volume, the Gain control also alters the amount of the tube's harmonic distortion, a major contribution to the warm sound characteristic of tube equipment.

Level

The Level knob is the master volume control. It determines the amount of signal from the preamplifier gain stage sent to the output stage. The cleanest signal is attained by setting the Level knob between 7 and 10 on the scale, then turning the Gain knob until the desired level is attained. Altering the Gain, Impedance, and Output controls together provides many useful tonal variations. The numeric values on the front panel for the Level control denote magnatude and are NOT specific dB values.

Polarity

The front panel toggle switch labeled **IN Ø** and **OUT Ø** determines the polarity of the LINE OUTPUT.

When **IN Ø** is selected, pin 2 is hot (positive). When **OUT Ø** is selected, pin 3 is hot (positive).

M610 EQ Controls

The M610 uses similar EQ "circuitry" as the 2-610. However the front panel controls and associated options are reduced.

- Boost: This toggle switch has three positions; MID, OFF, HIGH. The HIGH position activates a gentle "shelf" that peaks (+4db) at 8kHz. The MID position activates a similar "shelf" that peaks (+2db) at 4kHz. The OFF position bypasses the boost EQ.

- Low Cut: This toggle switch has three positions: OFF, 140, 70. The 70 position activates a 6dB/octave high pass filter (-3db at 70 Hz). The 140 position activates a 6dB/octave high pass filter (-3db at 140 Hz). The OFF position by-passes the low cut EQ.

+48 V (Phantom Power)

Most modern condenser mics require phantom voltage to operate and we recommend checking the requirements of your microphones before connecting them. It is good practice to keep phantom power off (switch down) when it is not required. To avoid loud transients, always keep the phantom power off when connecting or disconnecting microphones.

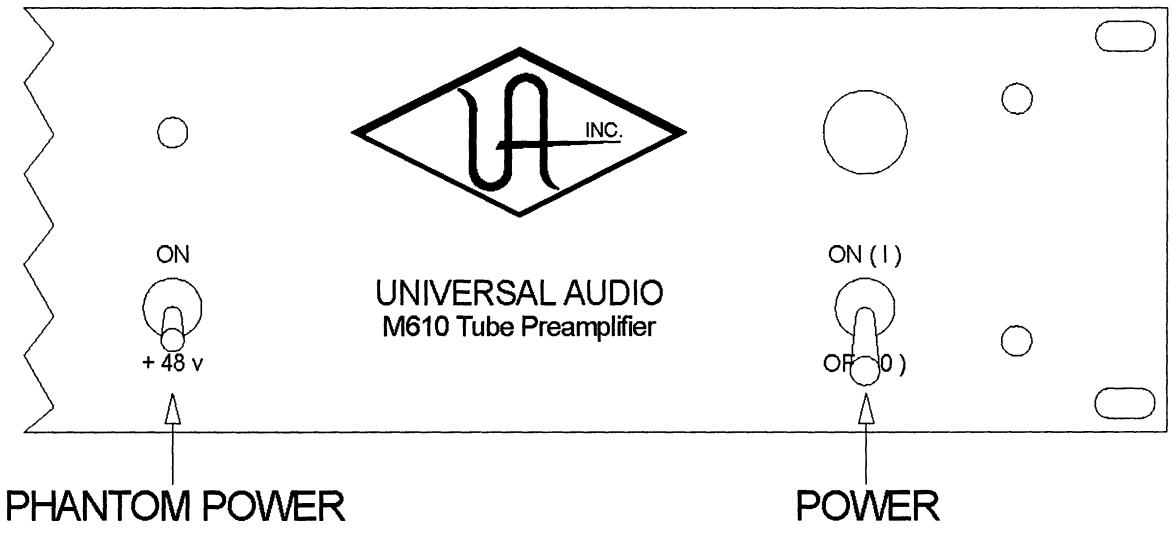


Figure 6: M610 front panel

M610 Rear Panel

The left side rear panel view (Figure 5) shows the AC Power inlet with a Fuse Holder and a Voltage Selector switch. The right side view (Figure 6) shows the MIC INPUT, LINE INPUT, and LINE OUTPUT XLR connectors.

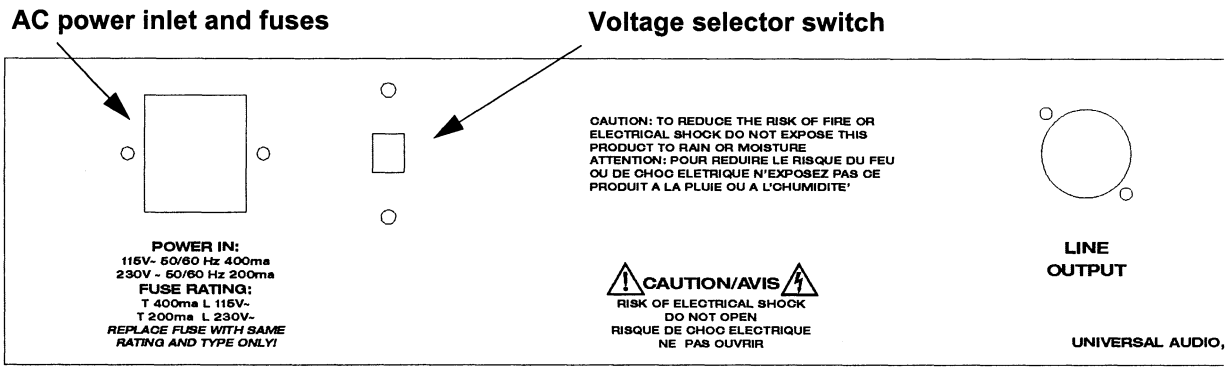


Figure 5: Left side rear panel

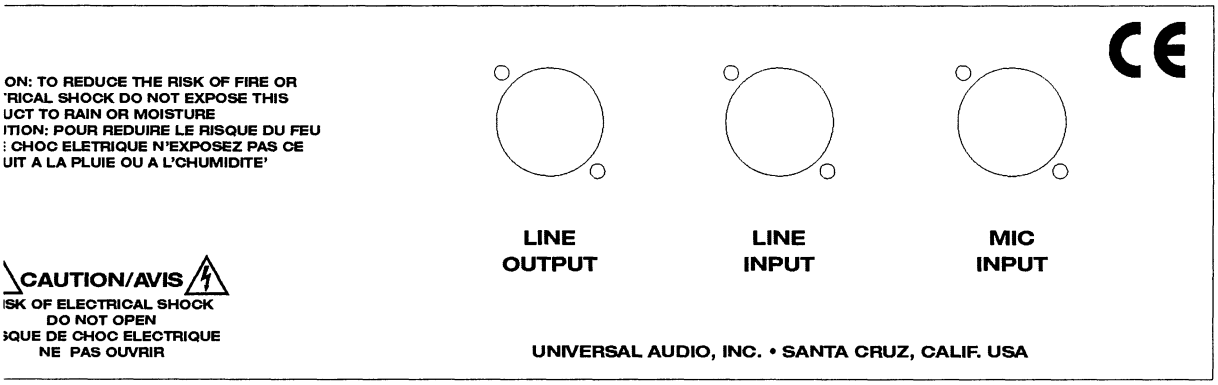


Figure 6: Right side rear view

Input/Output

Standard XLR input and output connectors are provided on the rear panel. Pin 2 is wired positive (hot) on the LINE and MIC INPUTS. Pin 2 is positive on the LINE OUTPUT when the front panel Polarity toggle switch is down (IN ∅). Pin 3 is positive on the LINE OUTPUT when the front panel Polarity switch is up (OUT ∅).

Voltage Selector Switch

The M 610 can operate at 115 V or 230 V by sliding the voltage selector switch located below the power cable connector. ***Make sure the switch is properly set for the voltage in your area before applying AC power to the unit!***

AC Power

The M610 uses a standard, detachable IEC power cable.

Fuse/Mains

The AC power fuse is located in the AC power connector block. Remove the power cord before checking or changing the fuse.

- A 400 mA time delay (slow blow) fuse is required for operation at 115 V.
- A 200 mA time delay (slow blow) fuse is required for operation at 230 V.

History

Bill Putnam Sr. was awarded the 2000 Technical Achievement Grammy for his multiple contributions to the recording industry including the design of the modular console. Highly regarded as a recording engineer, studio designer, and inventor, Putnam was a favorite of Frank Sinatra, Nat King Cole, Ray Charles, Duke Ellington, Ella Fitzgerald and many other musical icons. The studios he designed and operated were acclaimed for their distinctive sound and provided a fertile environment for his innovations and experiments. Universal Recorders in Chicago, United and Western in Los Angeles (now Ocean Way and Cello) all preserve elements of his room designs. Putnam started three companies (Universal Audio, Studio Electronics, and UREI) that built products which remain widely used decades after their introduction.

In 1999 Putnam's sons, Bill and James, re-launched Universal Audio with two goals:

- reproduce classic analog recording equipment designed by their father and his colleagues;
- research and design new recording tools in the spirit of vintage analog technology.

Universal Audio has rapidly released two reproductions of classic compressors (1176LN and Teletronix LA-2A), designed a new mic-preamp (2-610), acquired Kind of Loud Technologies, and launched its first digital product line (Powered Plug-Ins). Each and every UA project is motivated by it historical roots and a desire to wed classic analog sound with modern recording technology.

The 2-610 was inspired by the 610 console Putnam designed in 1960 for his United Recording facility (now Ocean Way) in West Hollywood. As most of Putnam's innovations, the 610 resulted from pragmatically solving a recurring problem in the studio: repairing a console without interrupting a session. The traditional console of the 1960s was a one-piece control surface with all components connected via patch cords. Any problem brought the session to a screeching halt while the console was dismantled. Putnam solved the problem by building a mic-preamp with gain control, echo send, and adjustable EQ on one modular chassis (with a printed circuit board) attached to the main console frame with one plug. While modular consoles are commonplace today, the 610 was a remarkable breakthrough at the time.

Less than ten 610 consoles were built for United and later Western Recording. As the modular concept gained acceptance, the 610-A was introduced and sold through Universal Audio/Studio Electronics. The 610-A featured a three-channel Program switch and a vertical circuit board connected to a 30° sloped control surface.

While the 610 was designed for practical reasons, its popularity with the artists who recorded at United and Western in the 60s, such as Sarah Vaughan, Frank Sinatra, and The Beach Boys, was due to its warm, clean sound. At least one 610 module is still in use at Ocean Way today. Wally Heider, the legendary engineer and manager of remote recording at United, used his 610 console for many Doors recordings (including *LA Woman*), Peter, Paul and Mary *In Concert*, Wes Montgomery *Full House* and all of the live Smothers Brothers albums. In 1987

Heider's console was acquired by Paul McManus, who spent a decade restoring it. We thank Paul for his work on the console and his help tracing the history of the 610.

Allen Sides, who purchased Ocean Way from Putnam, was impressed as a youth by the quality of the live *Hawaii Calls* broadcasts, which were recorded on a 610 console. He personally traveled to Hawaii to collect the original 610 used to record those broadcasts and installed it in Studio A. Jack Joseph Puig has been ensconced in Studio A with the 610 (and a stunning collection of vintage gear) for nearly five years, applying the vintage touch to a wide variety of contemporary artists including Beck, Hole, Counting Crows, Goo Goo Dolls, No Doubt, Green Day, and Jellyfish.

The UA team spent nearly two years researching and designing the 2-610. The resulting mic-preamp has all the warmth and unique character of its predecessor with the functionality required by the modern studio. The most important aspect–and hardest to quantify–is its sonic clarity that makes you fall in love with recording music again. We aspire to provide that tingly, hair-raising sensation you get when you record a guitar and it sounds better than you dreamed; when a vocal hits you right in the chest... It's these intangible but wonderful moments that we strived to recreate and hope you will experience. Enjoy!