Automated Processes, Inc.

3124mb+

All-Discrete
4-Channel Mic/Instrument Preamplifier with Stereo Mixer

Operator's Manual

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2015

Table of Contents

1.0 Introduction

Thank you for purchasing API's 3124mb+! This is the 3124mb+ operator's manual. The purpose of the operator's manual is to guide you, the audio engineer, through the 3124mb+ features and functions. What follows is a comprehensive guide that will explain how and why each feature can be used in a professional, project, or home studio. Each of the 3124mb+ preamplifier and stereo mixer parameters is covered. Included are signal flow schematics and block diagrams that may help troubleshoot any issues that arise when using the 3124mb+. After reading this operator's manual, you will be armed with all the necessary knowledge to efficiently use the 3124mb+ so that you can spend more time making music.

2.0 Overview

Both the 3124+ and the 3124mb+ (see Figure 1) are designed with the professional engineer in mind. Both units give the highest possible quality 4 channel mic preamp. However, the 3124mb+ provides an additional audio mixer with a transformer balanced output, keeping the unit size and price at a reasonable level. Both models are equally at home in the control room, studio, and recording truck or on stage.

Figure 1: 3124mb+ Front Panel

2.1 3124mb+ Features and Introduction

Features

- Uses API 2520 Op-Amp
- Classic Console Circuit
- Four XLR Mic Inputs
- Four ¼" Unbalanced Inputs
- Front Panel Polarity Switch
- Front Panel 20 dB Pad Switch
- Front Panel Mic Switch
- Front panel 48V Phantom Power Switch
- Output Clips at +30dBm

The 3124mb+ utilizes the same microphone preamp circuit that is used in all API consoles. It uses a 115 K type mic input transformer along with the same API proprietary output transformer that is used across API's product line. The unit has an internal 48 volt phantom power supply, which is front panel switchable for each channel. Also provided is a front panel -20dB pad switch that affects both the rear mic in and front Hi-Z in. A ¼" phone jack is available on the rear panel for each channel as an insert tip-send/ring-return placed between the mic preamp output and the mixer input.

Like the 3124+, the 3124mb+ provides up to 65 dB of gain to an output clip level of +28dBu. The Hi-Z front panel input goes directly to the op-amp, allowing a low level input such as a guitar or bass to be amplified without a matching transformer or direct box. This Hi-Z input can accept input levels as high as +20 dBu, making it perfect for keyboards and other high level devices. The rear output is an XLR connector.

Additionally, the 3124mb+ adds a stereo panner with a level control, and a post "fader" aux send. The stereo panners and the aux sends are bussed to master output controls and then to the rear panel jacks. A stereo aux return is provided to return effects or cascade additional mixers for more inputs. The unique stereo aux return control acts to balance the left and right signal, yet staying stereo. It can also be used as a mono return.

3.0 Signal Flow and Block Diagram

3.1 3124mb+ Signal Flow

Figure 2: Signal Flow

3.2 Additional Routing

3.2.1 Insert

Engaging the INSERT, by connecting a TRS cable to the INSERT jack, will add the INSERT routing to a channel's signal flow. The TRS cable's "tip" carries the signal out from the 3124mb+ channel and the cable's "ring" carries the returning signal from the insert device. This can be useful for adding signal processing to an individual channel.

3.2.2 Auxiliary Send/Return

AUXILIARY functions are controlled from the 3124mb+ front panel. Each channel has its respective AUX knob which control how much of a channel's signal is being sent to the AUX bus. The summed AUX signal can then be sent and returned to an external signal processor via independent TRS connections. AUX level and AUX return pan can be adjusted by using the respective knobs located on the 3124mb+ front panel.

3.3 Preamplifier Block Diagram

Figure 3 shows a block diagram that illustrates signal flow through each preamplifier channel of the 3124mb+. Understanding the signal flow through each preamplifier channel will help develop a better understanding of how and when each channel's parameters can be used.

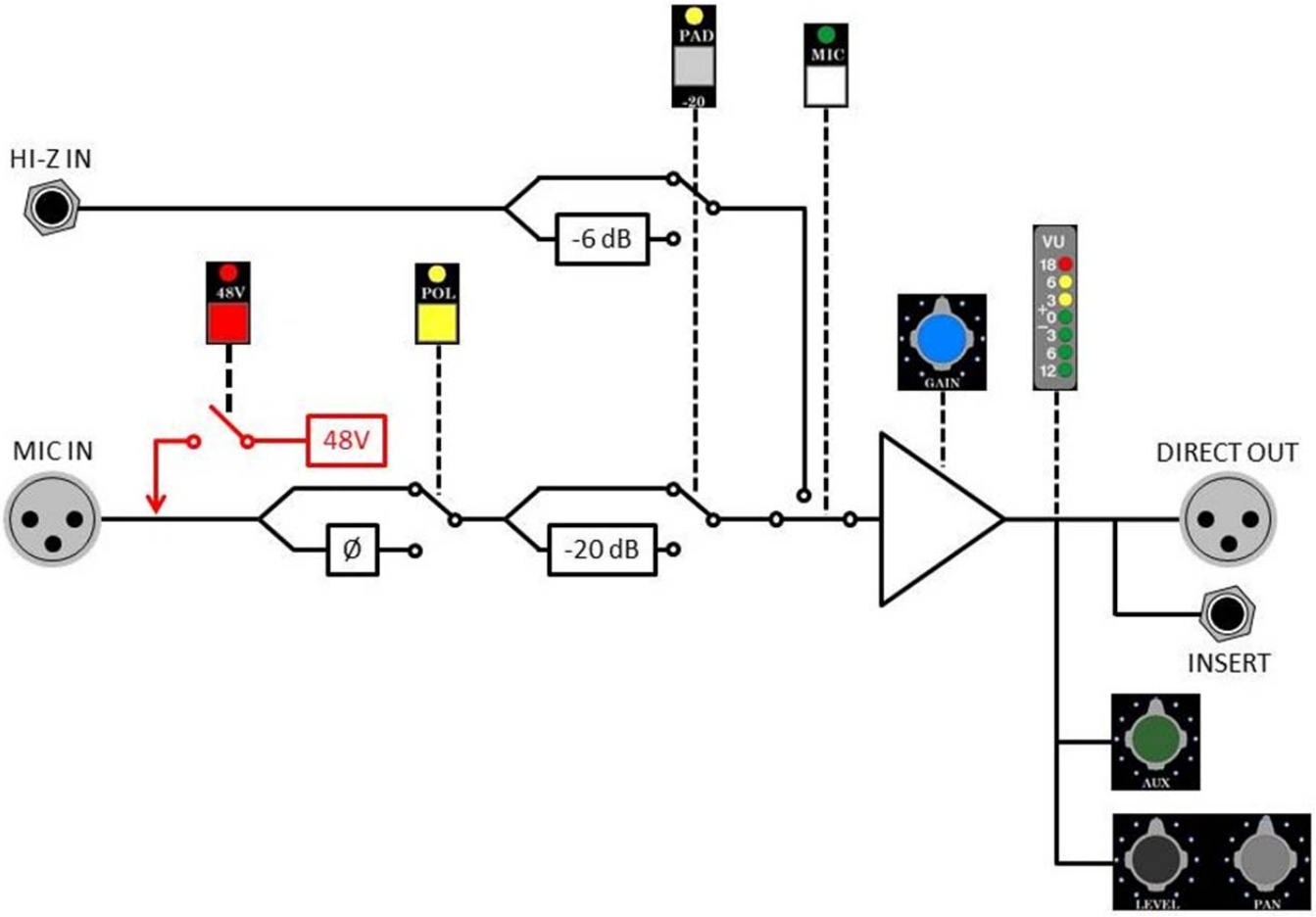


Figure 3: Preamplifier Signal Flow

3.4 Stereo Mixer Block Diagram

Figure 4 shows a block diagram that illustrates signal flow through the stereo mixer section of the 3124mb+. Understanding the signal flow through each preamplifier channel will help develop a better understanding of how and when each channel's parameters can be used.

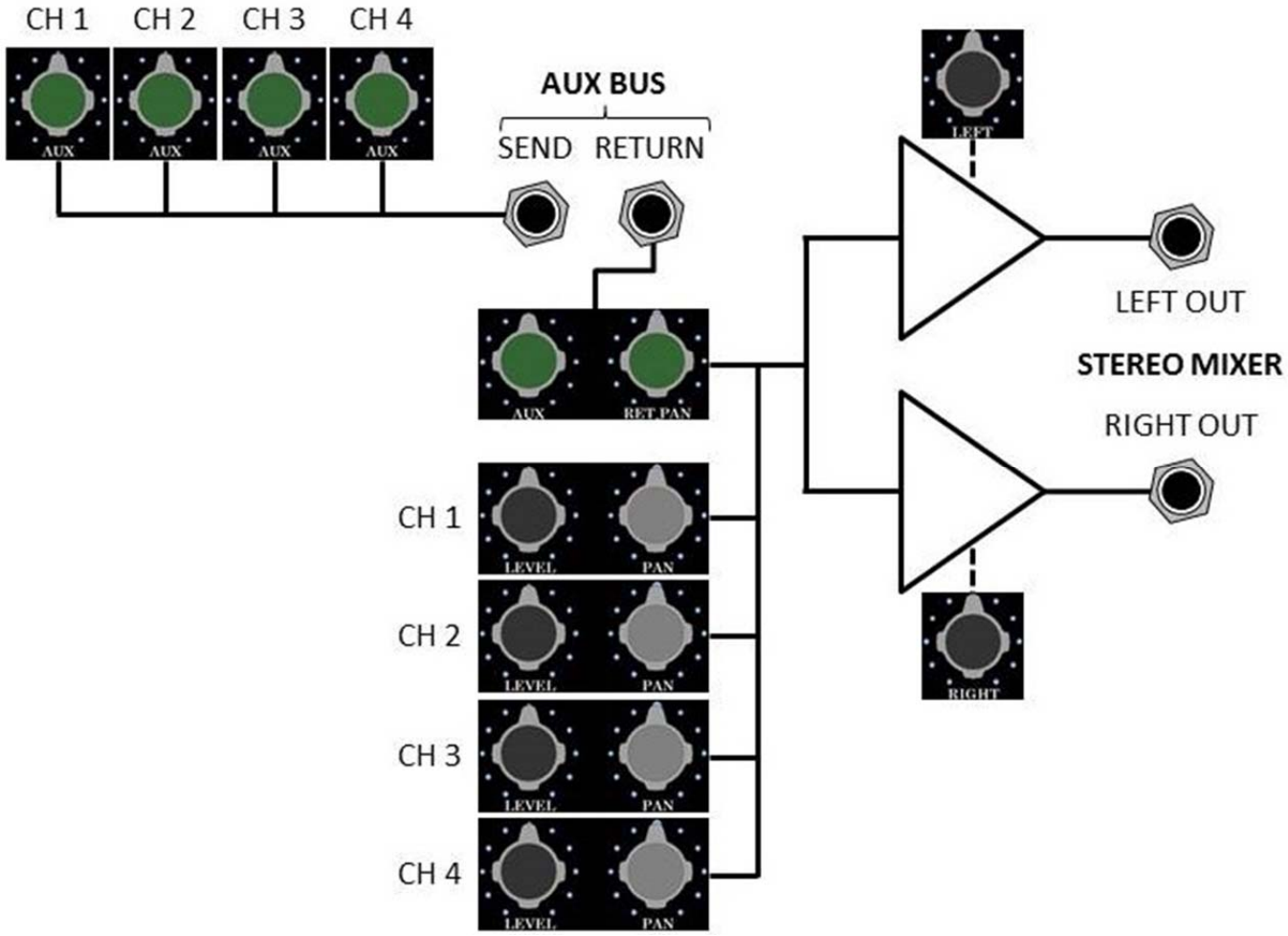


Figure 4: Stereo Mixer Signal Flow

4.0 Input Section: Mic/Line/Instrument Preamplifier

4.1 Preamplifier Overview and Features

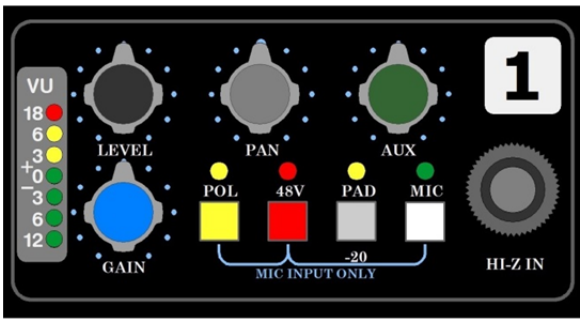


Figure 5: Channel 1 Preamplifier Section

Each of the four 3124mb+ preamplifiers (see Figure 5) is an all-discrete microphone/instrument/line pre-amplifier designed to provide an unusually good sounding front-end for all types of audio recording applications. Sonically, it offers the distinct API sound, high quality performance, and low noise.

Each preamplifier remains faithful to the circuit designs of API's founder, Saul Walker. Fully featured, each carefully preserves the original sound character that made it so much a part of the early days of recording.

Offering high headroom and a wide variety of inputs and input access points, each preamplifier is equally at home in the commercial recording studio as it is in the home project studio.

Features

- Uses API 2520 Op-Amp
- XLR Mic Input
- ¼" Unbalanced Input
- Front Panel Polarity Switch
- Front Panel 20 dB Pad Switch
- Front Panel Mic Switch
- Front Panel 48V Phantom Power Switch

4.2 Preamplifier Controls

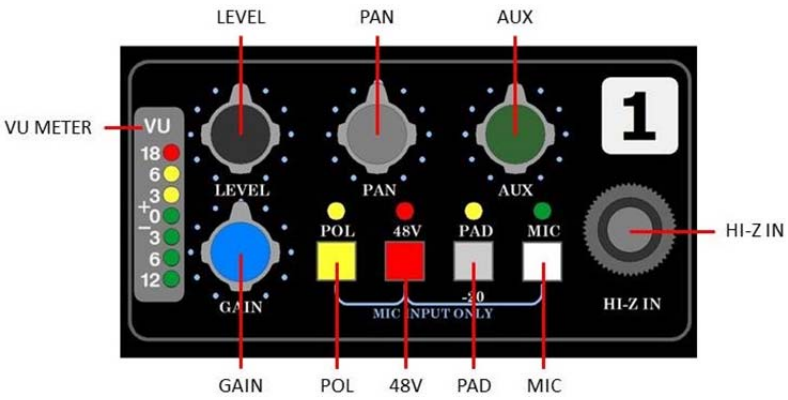


Figure 6: Channel 1 Controls

Each preamplifier provides a comprehensive suite of controls:

- GAIN: Preamp gain
- POL: Preamp input polarity inverter
- 48V: Phantom Power
- PAD: -20 dB microphone pad/-6 dB instrument pad
- MIC: Mic-Instrument input selector

- HI-Z IN: ¼" high-impedance instrument input
- LEVEL: Stereo mixer send level
- PAN: Stereo mixer send pan
- AUX: Auxiliary bus send level
- VU METER: 7 LED VU meter

4.3 Input Selection

Each preamplifier can receive three (3) input sources:

- MIC (Microphone): Rear panel female XLR microphone input with switchable 48V phantom power
- INST (Instrument): Front panel ¼" unbalanced -10dBu instrument level input

4.3.1 MIC Switch

The MIC switch is used to select the input source. When the green LED above the switch is illuminated, the rear panel XLR input is the active source. When the green LED above the switch is not illuminated, the front panel ¼" input is the active source.

4.3.2 Microphone Input

Select the microphone input by pressing the MIC switch and a green LED should turn on above the MIC switch. The MIC input connection on the rear panel will be the active input.

- Female XLR microphone input
- 48V phantom power
- -20 dB pad
- Green LED illuminates when MIC switch engaged
- VU meter indicates level of preamplifier output

48V: Provides 48 volt phantom power to the MIC input female XLR connector

- Red LED above switch illuminates when engaged

IMPORTANT: ***Caution should be exercised when engaging phantom power! Damage can occur if phantom power is applied to some audio devices, including most ribbon microphones. The 3124mb+ output should also be fully lowered when engaging the 48V switch.***

-20 dB PAD: Inserts a -20 dB attenuator after the microphone input

- Yellow LED above switch illuminates when engaged

GAIN: microphone preamplifier level control

- 10 dB minimum gain (including PAD)
- 65 dB maximum gain (including PAD)

4.3.3 Instrument Input

The ¼" jack on the front panel is the active input when the MIC switch is not engaged.

- -10 dB instrument level input
- Unbalanced, high-impedance input (¼" tip-sleeve)

GAIN: Instrument preamp level control

- 14 dB minimum gain
- 50 dB maximum gain

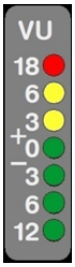
4.4 Polarity Inverter

A polarity inverter (sometimes referred to as a "phase reverse") is available at the input of the preamplifier.

POL (Polarity): Inverts the polarity of the signal at the input of the preamplifier.

- Yellow LED above switch illuminates when engaged

4.5 VU Meter



The preamplifier outputs can be monitored via the VU meter in each input section.

4.6 Direct Output

Each preamplifier's output is available at its respective OUTPUT connection on the rear panel.

- XLR connection
- Plugging into the OUTPUT jack does not break the connection to the INSERT jack

4.7 Preamplifier Block Diagram

Figure 7 shows a block diagram that illustrates signal flow through each preamplifier channel of the 3124mb+. Understanding the signal flow through each preamplifier channel will help develop a better understanding of how and when each channel's parameters can be used.

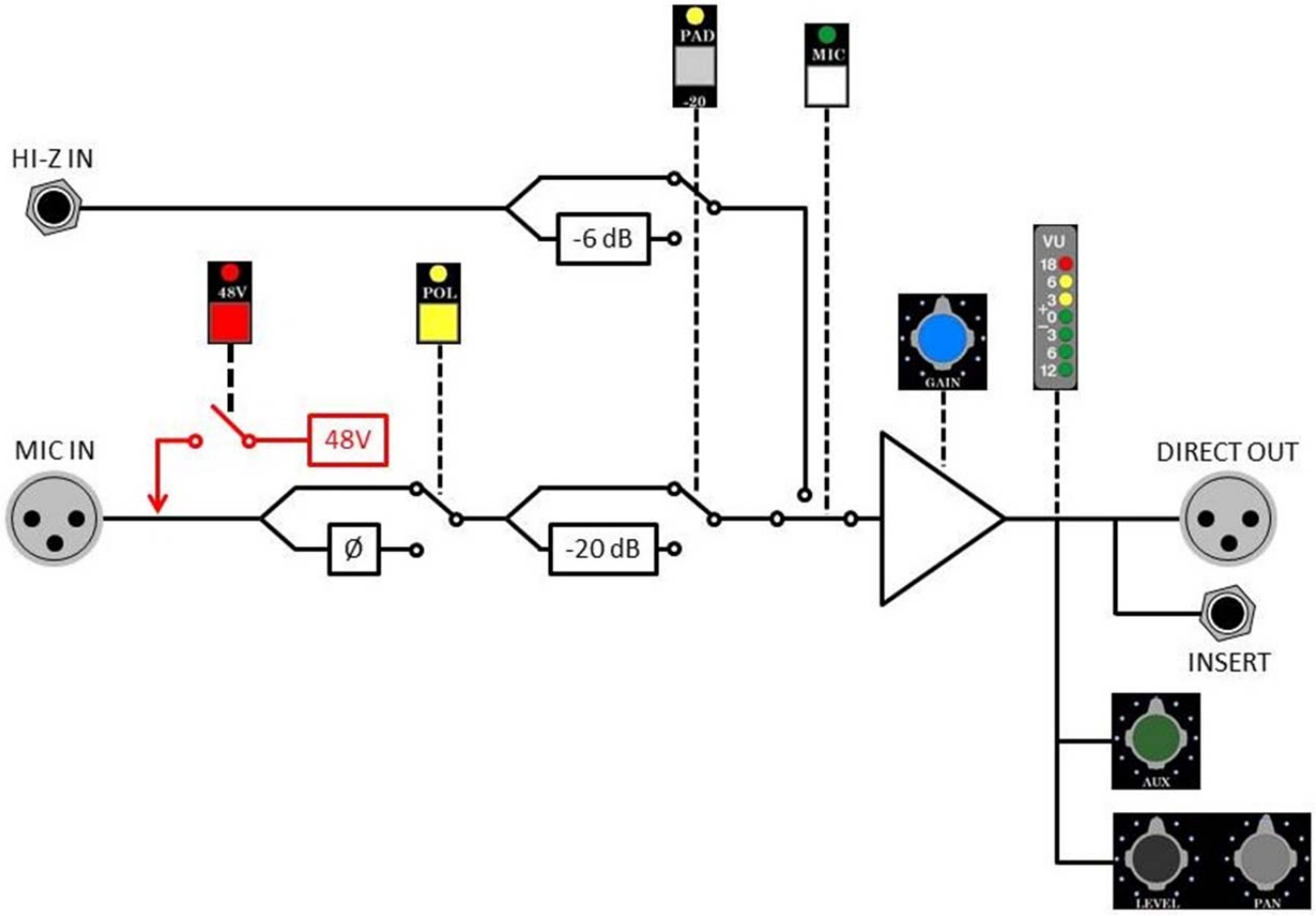


Figure 7: Preamplifier Signal Flow

5.0 Output Section: Stereo Mixer

5.1 Stereo Mixer Overview and Features

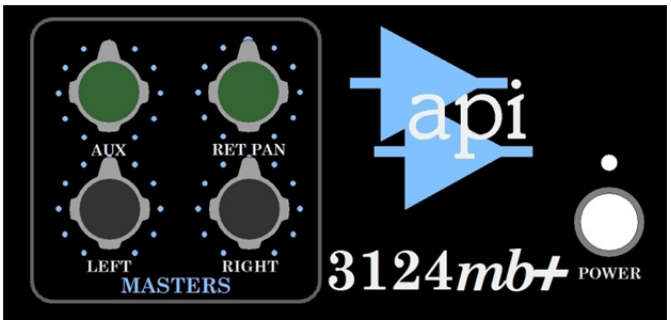


Figure 8: Stereo Mixer Section

The 3124mb+ output section (see Figure 8) offers a built-in summing stereo mixer with independent left and right master level controls. The stereo mixer also includes an auxiliary bus whose level and return pan can be controlled from the front panel.

Features

- Full attenuation to +10 dB of gain
- High headroom +28 dB clip level
- Traditional API fully discrete circuit design
- API 2520 discrete op-amp with transformer output

5.2 Stereo Mixer Controls

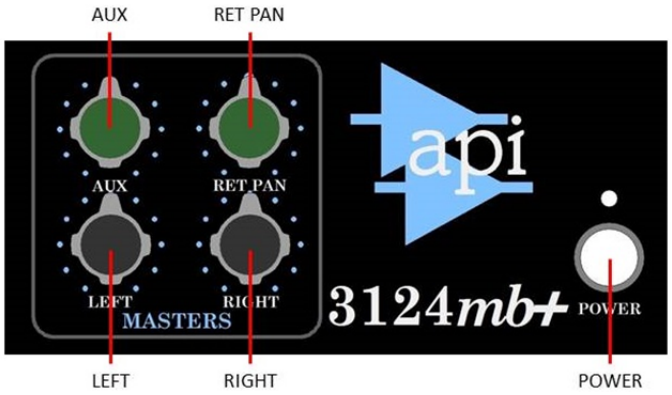


Figure 9: Stereo Mixer Controls

The Stereo Mixer provides a comprehensive suite of controls:

- LEFT: Master level for left channel
- RIGHT: Master level for right channel
- AUX: Auxiliary return level
- RET PAN: Auxiliary return pan

5.2.1 Masters

LEFT, RIGHT: Main output faders

- Full attenuation (-∞) to +10 dB of gain
- Detented rotary pots for easy recall

5.2.2 Auxiliary Level

AUX: Auxiliary return level

- Controls amount of auxiliary return signal mixed with main output

5.2.3 Auxiliary Return Pan

RET PAN: Auxiliary return pan

- Controls pan of auxiliary return signal mixed with main output

5.3 Stereo Mixer Block Diagram

Figure 10 shows a block diagram that illustrates signal flow through the stereo mixer section of the 3124mb+. Understanding the signal flow through each preamplifier channel will help develop a better understanding of how and when each channel's parameters can be used.

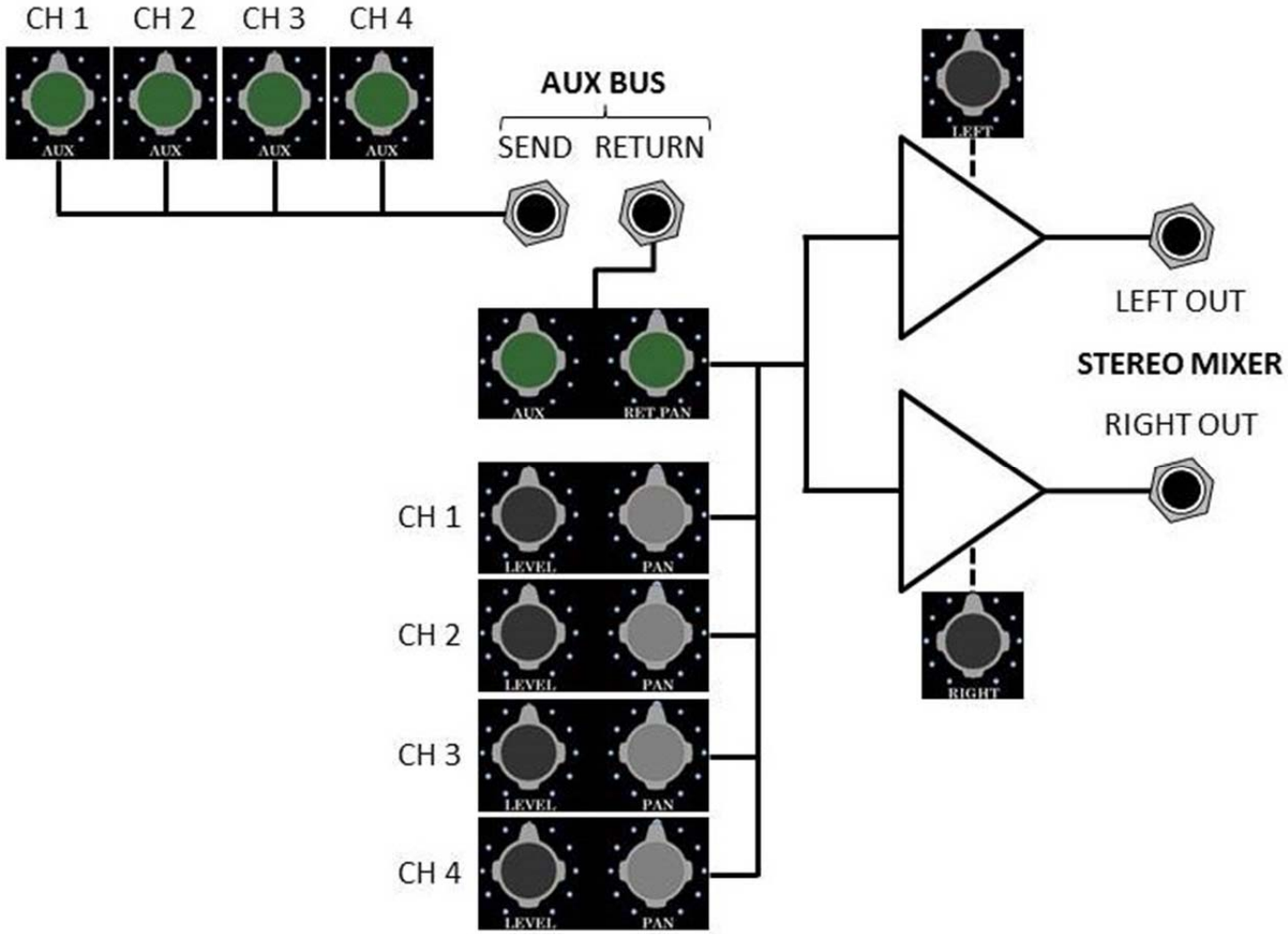


Figure 10: Stereo Mixer Signal Flow

6.0 Panel Interfaces

6.1 Audio Path Inputs

6.1.1 Front panel

Figure 11: Front Panel Input Connections

6.1.2 Rear Panel

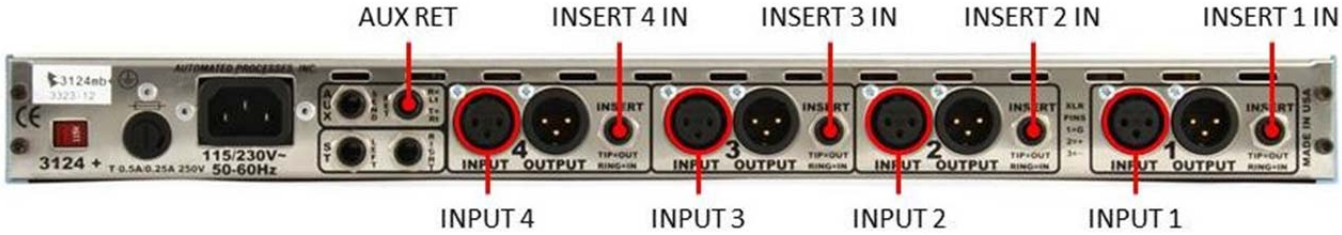


Figure 12: Rear Panel Input Connections

6.2 Audio Path Outputs

6.2.1 Rear Panel

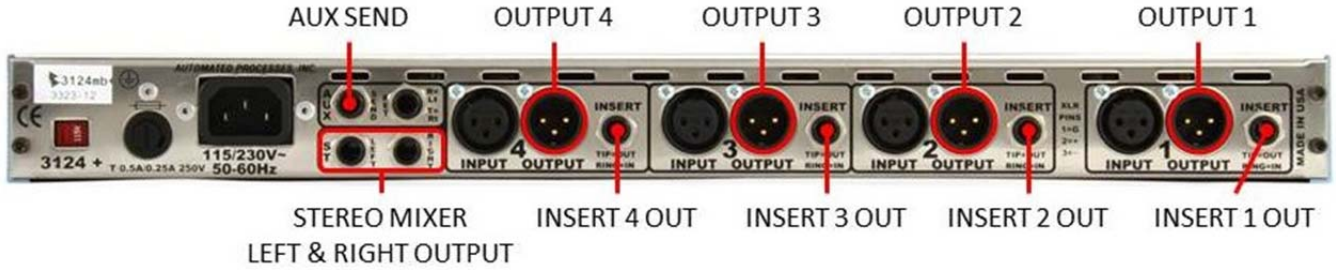


Figure 13: Rear Panel Output Connections

7.0 AC Power

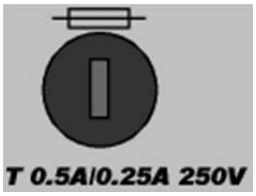
The 3124mb+ can operate on either 115 volts or 230 volts 50-60 Hz AC power.

The AC power is supplied via the IEC connector on the rear panel.

Operating voltage is determined by the Voltage Selector switch.

Voltage Selector Switch: Selects operating voltage

- 115 volts
- 230 volts



The fuse holder is located on the rear panel.

- 0.5A/0.25A 250V

The AC power switch for the 3124mb+ is located at the lower right of the API logo on the front panel.

- A blue LED indicator illuminates when the unit is on.

8.0 Customer Support

For further information and inquires, please contact API's customer support:

- Call us at 301-776-7879
- Fax us at 301-776-8117
- Email us at service@apiaudio.com

Appendix

i. Specifications

Input Impedance:	Mic: 1500 Ω Unbalanced: 470 kΩ Hi-Z
Output Impedance:	Less than 75 Ω Channel Outputs
Nominal Levels:	XLR Channel Output +4 dBu
Stereo Output Level:	Balanced: +4 Unbalanced: Nominal -2
Clipping Level:	XLR Channel Output better than +28 dBm
Frequency Response:	+0, -5, 10 Hz to 20 kHz (-0.5 at 10 Hz)
Noise EIN:	Mic: -129 Unbalanced Actual: -129
Measured Noise:	Better than -91 dBm/Below Nominal +4
Distortion:	All Outputs at +4 Out, 0.03% All Outputs at +22 Out, 0.09%
Gain Range:	150 Ω Input: 10 dB Min, 65 dB Max (Incl. PAD) Unbalanced Input: 14 dB Min, 50 dB Max
VU Meter:	Calibrated for XLR Outputs, OVU = +4 dBu (-12, -6, -3, 0, +3, +6, +18)
Controls:	GAIN, PAD (20 dB), 48V (Volts), POL (Polarity), MIC (Mic/Unbalanced), VU, AC
Power Consumption, Quiescent:	19.2 Watts
Size:	19” × 1.75” (1U) × 10.5” Deep
Size (Boxed for Shipping):	23.25” × 6.5” × 16”
Actual Weight:	11.54 lbs.
Shipping Weight:	15.3 lbs.