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World Leader of In-Rack, Audio, Video, Data Monitoring, and Closed Captioning Solutions

SUM Series

- AMP1A SUM6/RD
- VMDA-SUM8

1RU Summing Audio Monitors

User Guide

Part Number 821025, Revision B

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SUM Series User Guide

Introduction

Overview

The SUM Series of audio monitors provide self-powered, full-fidelity stereo or monaural monitoring in a single (1U) industry standard rack-space mount. The AMP1A-SUM6/RD model features speakers driven by three power amplifiers: two amplifier/driver combinations to handle midrange and high frequency information in stereo, while a third center channel reproduces information below the 500 Hz crossover point for reproduction through the woofer. The AMP1A-SUM6/RD model, has two midrange and one woofer speaker in a 6.5" depth. The VMDA-SUM8 provides either analog or AES digital inputs, summed as mono or stereo through two amplifier/drivers in an ultr-shallow 4.5" depth.

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Safety Instructions

1. Read, keep, and follow all of these instructions; heed all warnings.
2. Do not use this equipment near water or moisture.
3. Use only a dry cloth to clean the equipment.
4. Do not block any ventilation openings. Install only in accordance with the instructions in the section entitled, "[Installation Recommendations](#)" on [page 6](#).
5. Do not install near any heat source such as a radiator, heat register, amplifier, or stove.
6. Do not attempt to plug the unit into a two-blade outlet (with only two prongs of equal width).

IMPORTANT: By design, these monitors will only plug into a three-prong outlet for your safety. If the plug does not fit into your outlet, contact an electrician to replace the obsolete outlet.

7. Protect the power cord from being walked on or pinched, particularly at plug's source on the equipment and at the socket.
8. Use only the attachments/accessories specified by the manufacturer.
9. Unplug the equipment during lightning storms or when unused for long periods of time.
10. Refer all servicing to qualified service personnel. Servicing will be required under all of the following conditions:
 - The equipment has been damaged in any way, such as when the power-supply cord or plug is damaged.
 - Liquid had been spilled or objects have fallen onto the equipment.
 - The equipment has been exposed to rain or moisture.
 - The equipment does not operate normally.
 - The equipment has been dropped.

Installation Recommendations

Mounting

The unit is designed to install into a standard 19" rack mounted at eye level for best visual observation of the monitor screens.

Heat Dissipation

The ambient temperature inside the mounting enclosure should not exceed 40° Celsius (104° Fahrenheit). Adjacent devices can be rack mounted (or stacked) in proximity to the unit if the above temperature is not exceeded. Allow a 1RU (1.75"/44.45mm) space above and below the unit for air circulation.

Important: To reduce noise, the monitor have any fans. As a result, the heat generated by the class D power amplifiers, power supplies, and other components is vented by slots in the side of the unit. Therefore, as a safety precaution, we advise you to be sure to allow proper ventilation on both sides of the unit.

Power

The unit comes with a standard 24VDC/3.0A internal power supply and connects an A/C mains power source (65W, 100 to 240 VAC, 50/60Hz) to the IEC connector provided on the rear panel of the unit.

Sympathetic Vibration

Sympathetic vibration from other equipment (cables, etc.), in the rack may be serious enough to interfere with the unit's sound quality out in the listening area. The use of thin card stock and/or felt or foam weather-stripping type materials between adjacent vibrating surfaces, or tying up loose cables, etc., may be required to stop vibrations external to the unit.

Mechanical Bracing

The chassis is securely attached to the front panel at eight points along its surface, not just at the four corners of the chassis ears. This feature will reduce or eliminate rear bracing requirements in many mobile/portable applications. The weight of internal components is distributed fairly evenly around the unit.

Audio Connections

Connection of the audio feeds is straightforward. Please refer to the system interconnect block diagram on page 15 for clarification of the general signal paths into and out of the VMDA-SUM8 unit. Care should be exercised to avoid mismatched cable types and other similar causes of undesired reflections in RF signal systems.

Electrical Interference

As with any audio equipment, maximum immunity from electrical interference requires the use of shielded cable; however, satisfactory results can sometimes be obtained without it. The internal circuitry common is connected to the chassis.

Features

Common

- Only one rack space high
- Separate volume control for each channel
- Headphone output jack
- Fits in a 1U standard 19" rack space with a depth of only 4.5"
- Minimal power dissipation for a low operating temperature

- Low power consumption
- Power indication LED
- Excellent high frequency response for positive detection of background whine and noise
- Audible indication of phase/polarity problems
- Thorough magnetic shielding for placement next to video monitors
- Quick and easy installation: simply slide in the rack and connect audio and AC power

VMDA-SUM8 Features

- Master volume control
- Balanced mono output of the selected channels on a 1/4" phone jack
- LED indication of input signal type (digital or analog)
- LED indication of digital input signal lock status
- Analog inputs on a DB-25 connector
- Digital inputs on four female BNC connectors
- Termination select for each digital input connector
- Gain calibration adjustment of digital input signal pairs

AMP1A SUM6/RD Features

- Separate volume controls for each of the six inputs on a DB-25 connector
- 98 dB SPL at two feet

Applications

The SUM Series monitors are ideally suited for use in VTR bays, mobile production vehicles, teleconferencing installations, multimedia systems, satellite links and cable TV facilities, and on-air radio studios.

Specifications

Table 1–1 SUM Series Specifications

Specification	AMP1 SUM6/RD	VMDA-SUM8
AES/EBU Inputs	–	4 on BNC (Unbalanced)
Digital Input Termination	–	75 Ω
Digital Input Sampling Rate	–	Auto detection between 32 and 96 kHz
Digital Input Level for Full Output	–	-20 dBfs
Analog Inputs	6 on DB-25 (Balanced)	8 on DB-25 (Balanced)
Analog Input Impedance	200k Ω (Balanced)	100k Ω (Balanced)
Analog Input Level for Full Output	0 dBv Balanced -10 dB Unbalanced	0 dBv
Balanced Program Output		1/4" Phono Jack, Mono, retains mix balance, 0 dBv out at 0 dBv in under balanced conditions/max volume settings.
Hum and Noise	Better than -68 dB below full output	Better than -70 dB below full output
Electrical Distortion:	< 0.15% at any level below limit threshold	<0.3% below limiting threshold
Acoustical Frequency Response	80 Hz - 16 kHz ± 7 dB) (-10 dB @ 50 Hz, 22 kHz)	300 Hz to 10k Hz (± 6 dB)
Acoustical Distortion	8% or less worst case; typically < 2% above 180 Hz	Typically <2% at operating levels below limiting threshold, 300 Hz to 10k Hz
Peak Acoustical Output	90 dB SPL at 2 feet	80 dB SPL at 2 feet

Table 1–1 SUM Series Specifications

Specification	AMP1 SUM6/RD	VMDA-SUM8
Power output: RMS Each Side	10 W transient / 5 W continuous	10 W transient / 5 W continuous
RMS Bass	10 W transient / 5 W continuous	
Power (CE and UL approved)	100 to 240VAC, 50/60 Hz	
Power Consumption	35 W	45 W
Dimensions	1.75 x 19 x 6.5 inches (44.5x 483 x 165.1 mm)	1.75 x 19 x 4.5 inches (44.5x 483 x 114.3 mm)
Weight	5 lbs. (2.27 kg)	2.75 lbs. (1.25 kg)
Magnetic Shielding	<1 gauss any adjacent surface	<2 gauss any adjacent surface

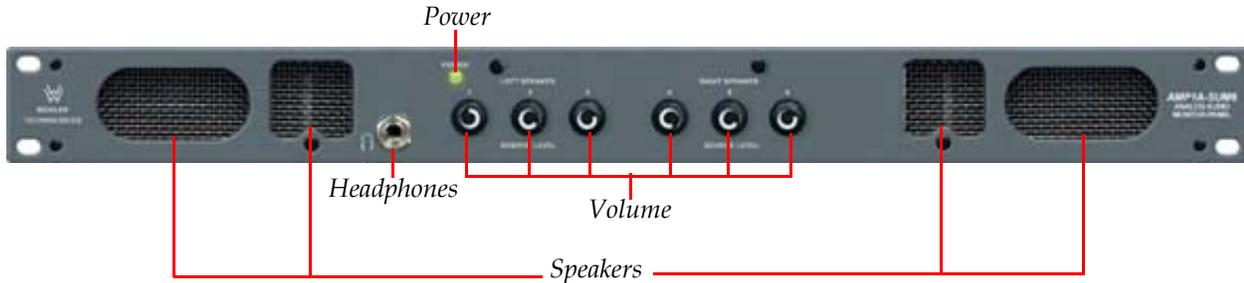
Front Panel Controls

Common Controls

- **Speakers** (Left and Right): The VMDA-SUM8 internal speaker system is comprised of two mid-range speakers capable of stereo or mono reproduction. The internal speaker system for the AMP1A-SUM6/RD model, to accommodate the reduced depth dimension, is comprised of two woofer speakers (center) and two mid-range tweeter speakers (left and right). The two mid-range speaker channels reproduce, in stereo, only the mid and high frequencies while the woofer speaker(s) monorally reproduce the low frequencies.
- **Headphone Jack:** Select the headphone audio sources as you would for the internal speakers. When you plug in headphones, the speakers will mute. This jack accepts a standard 1/4" phone type stereo plug as shown in • below.
- **Power LED:** This LED glows green to indicate that the mains powered 24V power supply is connected to the power connector on the rear panel.

AMP1A SUM6RD-Specific Controls

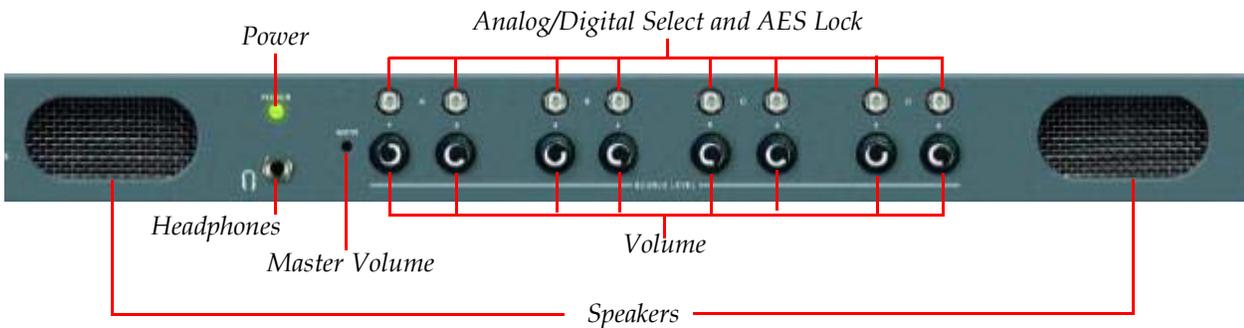
Figure 1–1 AMP1A SUM6/RD Front Panel



- **Volume**(Channels 1 to 3): These three controls independently affect the loudness of each of the first three source channels (1, 2 and 3), which are electronically summed together for reproduction from the left internal speaker (or left headphone, if connected).
- **Volume** (Channels 4 to 6): These three controls independently affect the loudness of each of the second three source channels (4, 5, and 6), which are electronically summed together for reproduction from the right internal speaker (or right headphone, if connected).

VMDA SUM8-Specific Controls

Figure 1–2 VMDA SUM8 Front Panel



- **Master Volume Control:** Turning this recessed trim-pot clock-wise increases the volume of the entire mix; when turned counter-clockwise it is decreased. Note that this control comes *after* the mix as set by the individual **Input Source Volume Controls**, so that the volume balance between channels (the mix) is maintained throughout master volume adjustment. Factory setting is full volume.

- **Input Source Volume Control** (1 through 8): Each of these volume controls affects the loudness of only the selected audio source for the channel it is associated with (1 through 8). Channel numbers are silk-screened above each control. When the unit is set for mono operation, all channels are summed together (at their respective levels) monaurally across both speakers. When set for stereo operation the left speaker reproduces the mix of channels 1, 3, 5, and 7 and the right speaker reproduces the mix of channels 2, 4, 6, and 8. Mono or stereo operation is selected by placing the 4-wire audio harness on one of two headers internal to the unit.

Note that the Input Source Volume Controls are positioned so that when operating the unit in stereo mode, the volume controls for channels 1/2, 3/4, 5/6, 7/8 are arranged in four left/right pairs. These pairs also correspond to the AES input channel pair designations of A, B, C, and D.

Digital Gain Calibration for each of the eight AES audio source channels is adjustable, allowing calibration relative to the analog input levels. Digital gain calibration is accomplished by adjusting eight trim-pots internal to the unit. Digital gain calibration is factory set at -20 dBfs digital to +4 dBu analog for all eight channels. See page 10 for setting instructions.

A Mute on Data feature is available allowing the unit to mute any of the four AES inputs when a datastream (i.e. Dolby) is detected at the AES input. Factory setting is for this feature to be activated. See page 10 for setting instructions.

The unit may be configured (with internal jumpers) to mute the AES input(s) and indicate an error (A/D Input Select Button glows red on front panel) when a set validity bit is detected at the input(s). Factory setting is for this feature to not be activated.

- **A/D Input Select Buttons and AES Input/Lock Indication LEDs** (1 through 8): Each of these buttons is used to select the source signal for the associated channel. Channel numbers are silk-screened below each button. Each button features an integrated bi-color LED (green/red) used for button status indication. When an analog source is selected, the button is unlit. When a locked AES source is selected the button glows green. When the selected AES

source is unlocked, the button will glow red. Refer to the chart below for button LED indication.

Table 1–2 Button/Indication Descriptions

Selected Source	Button/LED Indication
Analog	Unlit
AES (Locked)	Green
AES (Unlocked)	Red

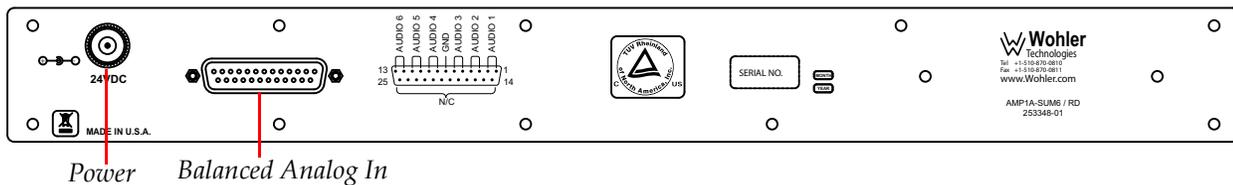
Rear Panel Connectors

Common Connectors

Power Connector: Attach the included 24V power supply between this connector and mains power connector. The Power LED on the front panel will glow green to indicate operating voltages are present. For polarity orientation, refer to the silk-screened diagram to the *right* of the connector.

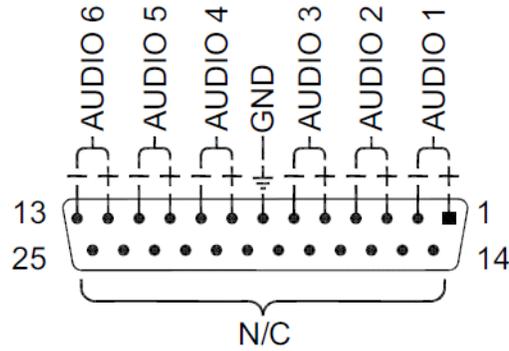
AMP1A SUM6RD-Specific Connectors

Figure 1–3 AMP1A SUM6/RD Rear Panel



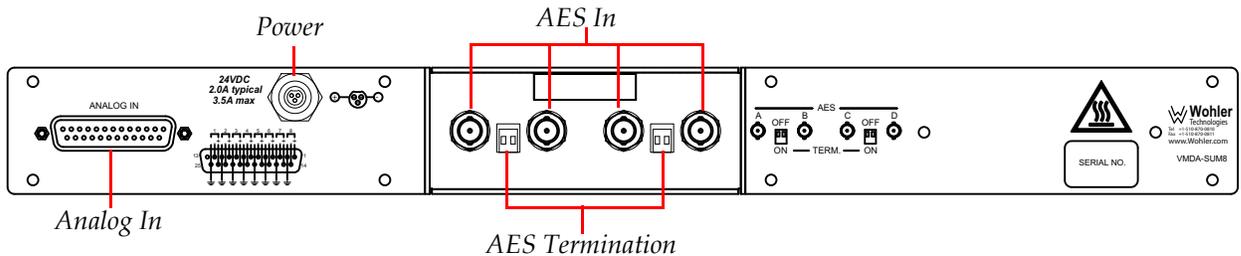
- **Balanced Analog In (1 through 6):** This balanced (200KΩ) female DB-25 connector accepts standard analog audio signals. Only the top row of pins are used for audio input. See [Figure 1–4](#) below for pin-out information including polarity.

Figure 1–4 Balanced Analog In - DB-25 Pin-Out



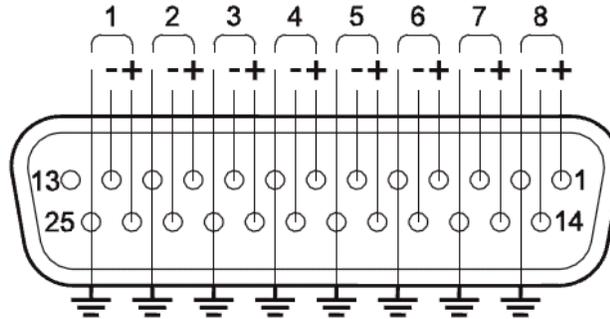
VMDA SUM8-Specific Connectors

Figure 1–5 VMDA SUM8 Rear Panel



- Analog In:** This DB-25 connector accepts eight channels of standard analog audio signals and is configured for balanced 100k Ω impedance connections. For channel and pin-out information of this connector, refer to [Figure 1–6](#) below or to the silk-screened diagram for the connector on the rear panel.

Figure 1–6 Balanced Analog In - DB-25 Pin-Out



- **AES In (A through D):** These four female BNC connectors accept two channels each (eight channels total) of **AES/EBU** digital audio signals and are configured for unbalanced 75 Ω impedance connections. These input connectors are referred to as A, B, C, and D from left to right (see silk-screened diagram at *left* of rear panel). Each of the inputs provides the following channels:
 - Input A - Channels 1/2
 - Input B - Channels 3/4
 - Input C - Channels 5/6
 - Input D - Channels 7/8
- **AES Input Termination Select (A through D):** These two two-position DIP switch modules allow termination selection for each of the four AES inputs. Each switch affects the connector to which it is closest. If an input is connected to downstream equipment, remove its termination by placing the associated switch in the up (off) position. If not connected, apply termination by placing its switch in the down (on) position. For settings, you can also refer to the diagram silk-screened to the left of the AES input connectors.

Technical Functional Overview

Figure 1-7 below and Figure 1-8 on page 14 illustrate the overall functionality of the SUM Series monitors.

Figure 1–7 AMP1A SUM6/RD Block Diagram

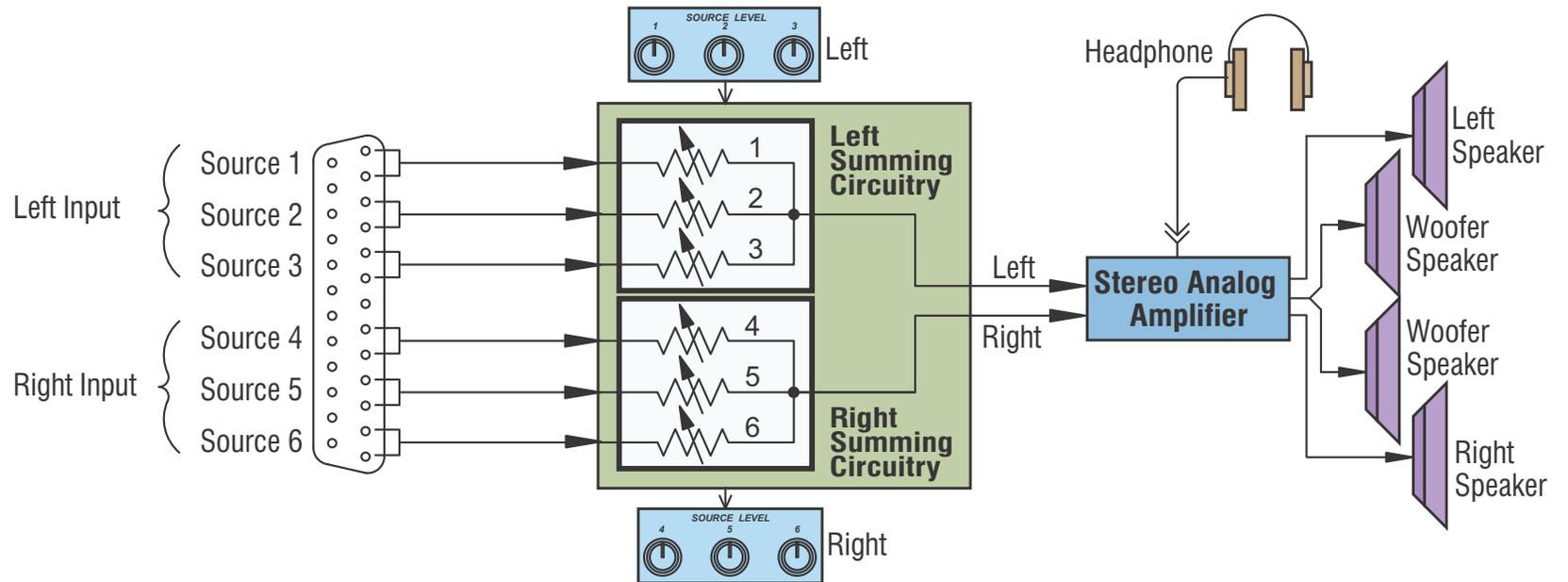


Figure 1–8 AMP1A SUM6/RD Block Diagram

