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## VAMP AC-3/M

2RU, Dolby Digital, Audio/Video Monitor  
with Level Meters

User Guide

**Part Number 821673, Revision B**

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VIDEO

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# VAMP AC-3/M User Guide

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## Introduction

### Overview

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The VAMP AC-3/M monitor is a complete, exceptionally high quality stereo video/audio monitoring solution available in a compact 2RU rack space with numerous input and output features that makes it ideal for facility-wide monitoring of analog/digital audio and video signals.

### Topics

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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.
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 3](#).
5. Do not install near any heat source such as a radiator, heat register, amplifier, or stove.
6. Do not expose the equipment to rain or moisture.
7. 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.

8. Protect the power cord from being walked on or pinched, particularly at plug's source on the equipment and at the socket.
9. Use only the attachments/accessories specified by the manufacturer.
10. Unplug the equipment during lightning storms or when unused for long periods of time.
11. 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

## Unpacking

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Unpack the VAMP AC-3/M monitor from the shipping container and inspect all components for shipping damage. If you find any damage, notify the shipping carrier for claims adjustments.

Compare the shipping box contents to the packing slip. Contact Wohler's customer support personnel about any discrepancies. (Wohler's contact information is on the copyright page ii, of this manual).

## Heat Dissipation

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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:** The heat generated by the 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.

## Rack Mounting

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You should install the monitor into a standard 19" rack and requires a maximum of 4RU of rack space (the 2RU unit, plus 1RU above and below). Also, install it as close to the operator's direct viewing angle as possible as LCD screens can appear to display anomalies outside this viewing angle.

**Note:** In PAL mode operation, the LCD driver discards every seventh line of active video so an entire video frame fits within the display screen. This is normal for most LCDs currently on the market.

## Cable Connections

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Wohler recommends Belden 8281 or Belden 1694A cables for analog video signals and Belden 9451 cables for analog audio signals.

## Power

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Each 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.

## Electrostatic Discharge (ESD)

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As with most electronic equipment, static discharges can damage components within the unit. Take precautions to ensure your installation environment is not subject to ESD.

## FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## Description

The VAMP AC3/M monitors video and de-muxed audio from the HD/SD-SDI source and may also monitor audio directly from Dolby Digital (AC-3), AES, or PCM balanced or unbalanced sources.

The source video is monitored on a built-in 4.3" high-resolution wide-format color LCD display. The video section automatically detects NTSC or PAL video signal formats. SD and HD sources are automatically detected and displayed with 4:3 or 16:9 aspect ratios respectively. Display controls include brightness and contrast adjustment. The selected audio source is reproduced through a internal powered speaker system comprised of left and right midrange and woofer channels for full fidelity sound in a rack-mounted unit.

The rear panel features two HD/SD-SDI inputs (selectable with a front panel toggle switch) and one re-clocked output of the selected HD/SD-SDI source on BNC connectors. HD/SD-SDI group and subgroup selection is set via front panel switches and an LED is provided to indicate SDI lock status. Balanced XLR and unbalanced BNC inputs and loop-through outputs are provided for monitoring of PCM (Pulse Code Modulation), AES, or AC-3 (Dolby Digital®) audio signals. A toggle switch and LED on the front panel are provided to indicate and allow selection between two AC-3 Pro-16 signals, if they are present. Two XLR connectors output analog audio of the sources selected for the left and right speaker channels.

High-resolution, wide-range LED bar graph level meters are provided for all six channels. The fifty-three bi-color segments, spanning a range of 65 simultaneously display signal levels according to both the PPM and VU standards. Bar graph brightness is adjustable via a trim potentiometer. Both front left/right and surround left/right phase LED indicators are provided to alert of possible phase cancellation from mix-down in any likely playback situation. Front panel LEDs provide AC-3 and AES input signal presence and power indication. A headphone output mutes the speakers when connected.

## Applications

The VAMP AC-3/M is ideally suited to provide high quality multichannel and/or digital audio and video monitoring in a very compact form. Ideal for use in VTR bays, mobile production vehicles, teleconferencing installations, multimedia systems, satellite links, cable TV facilities, and on-air radio studios.

# Features

## Audio

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- Headphone jack (mutes speakers)
- Two audio inputs on XLR/BNC connectors
- LED indication of selection and mix settings
- 53-segment tri-color LED bar graph level meters displaying simultaneous VU and PPM characteristics
- Phase indication LEDs for each metered channel pair
- Self-powered speaker system
- De-embeds HD/SD-SDI audio to analog audio outputs

## Video

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- 4.3" active matrix, color TFT LC display with 16:9 native aspect ratio and brightness and contrast controls.
- Auto-detection of NTSC and PAL video formats
- Digital signal status indication via LEDs
- Two HD/SD-SDI video inputs with A/B switching.
- Re-clocked HD/SD-SDI output from the SDI input function regardless of other selection settings
- Digital signal status indication by LEDs

## Physical and Electrical

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- Low power consumption
- Highest fidelity in minimum 2RU rack space.



# Specifications

The VAMP AC-3/M meets the specifications listed in [Table 1-1](#) below through [Table 1-5 on page 9](#).

**Table 1-1 Audio Specifications**

Specification	VAMP AC-3/M
Inputs	1 Unbalanced AC-3 on BNC or 1 Balanced AC-3 on XLR
Outputs	2 Selected Analog on XLR
Level Meters	Six 53-segment high-resolution tri-color (red/yellow/green) LED bar graphs
Level Meter Scale	0 dB to -66 dB
Level Meter Mid-scale Resolution	1 dB
Level Meter Dynamics	VU and PPM, simultaneous
Peak Acoustic Output: (@ 2 ft.)	100 dB SPL
Output	10 W RMS (4 $\Omega$ ), left and right, 14 W peak
Converted Analog Out (S/N)	> 90 dB
Converted Analog Out (THD)	< 0.008%
Digital Reference	-20, -18, or -9 dBu
AES Input Sampling Rate	32 to 48 kHz, auto-select
AES D to A Converter	24-bit, low jitter
AES Termination (removable)	110 $\Omega$ balanced; 75 $\Omega$ Unbalanced
Frequency Response (6th Octave)	80 Hz to 16 kHz, $\pm 7$ dB (-10 dB @ 50 Hz, 22 kHz)
Hum and Noise	> -68 dB below full output
Electrical Response	20 Hz to -20 kHz ( $\pm 1$ dB)
Electrical Distortion	<0.15% at any level below input threshold
Acoustic Distortion	< 1.5% Typical at frequencies above 200 Hz; 6% or less at worst case

**Table 1–2 Video Specifications**

Specification	VAMP AC-3/M
Inputs	2 HD/SD-SDI on BNC
Outputs	1 SD/HD-SDI BNC re-clocked output of selected HD/SD input
Video Formats	NTSC/PAL auto-detecting
Signal Input Type	75 $\Omega$ BNC (SMPTE 259M, SMPTE 292M auto-detect)
Screen Type/Size (Diagonal)	4.3" (109.2 mm) Transmissive High-resolution LCD, active matrix TFT
Display Image Controls	Brightness and contrast
Aspect Ratio	HD-SDI = 16:9, SD-SDI = 4:3 or 16:9
Active Area (HxV)	95.04 mm x 53.856 mm
Resolution (Dots x Lines)	1440 H x 272 V
Resolution (Pixels x Lines)	480 H x 272 V
Pixel Format (HxV)	1 Pixel = R+G+B dots
Pixel Pitch (HxV)	0.198 mm X 0.198 mm
Pixel response Time (Typical)	30 ms rising; 30 ms falling
Color Configuration	RGB Vertical Stripes
Number of Colors	1.6 million
Viewing Angle	Top=80°, Bottom=80°, Left=80°, Right=80°
Contrast Ratio (typical)	400
White Luminance (Brightness)	165 (typical) NITs (cd/m <sup>2</sup> )
Backlight Type	LED
LED Backlight Life	10,000 hours (average) to specified reduction

**Table 1–3 Power and Other Specifications**

Specification	VAMP AC-3/M
Magnetic Shielding	<0.8 Gauss any adjacent surface
A/C Mains Input	100 to 240 VAC, 50/60 Hz universal input, with UL/CE/TUV approval
Power Consumption	60 W max; 100 to 240 VAC, 50/60 Hz universal input, with UL/CE/TUV approval

**Table 1–3 Power and Other Specifications**

Specification	VAMP AC-3/M
Dimensions	3.5" H x 19" W x 12" D (89 mm H x 483 mm W x 305 mm D)
Weight:	18 lbs. (8.2 kg)

**Table 1–4 SDI Display Video Raster Format Parameters**

Format	Scan Format Standards	Frame Rate	Lines	Active Lines	Samples	Active Samples
SDTV, 54	RP 174	60	525	507/487	3432	2880
SDTV, 36	SMPTE 267	60	525	507/487	2288	1920
SDTV, 27	SMPTE 125	60	525	507/487	1716	1440
SDTV, 54	ITU-R BT 601.5	50	625	577	3456	2880
SDTV, 36	ITU-R BT 601.5	50	625	577	2304	1920
SDTV, 27	ITU-R BT 601.5	50	625	577	1728	1440
HDTV, 74.25	SMPTE 260	30	1125	1035	2200	1920
HDTV, 74.25	SMPTE 274	30	1125	1080	2200	1920
HDTV, 74.25	SMPTE 274	30p	1125	1080	2200	1920
HDTV, 74.25	SMPTE 274	25	1125	1080	2640	1920
HDTV, 74.25	SMPTE 274	25p	1125	1080	2640	1920
HDTV, 74.25	SMPTE 295	25	1250	1080	2376	1920
HDTV, 74.25	SMPTE 274	25p	1125	1080	2750	1920
HDTV, 74.25	SMPTE 296 (1, 2)	50p	750	720	1850	1280
HDTV, 74.25	SMPTE 296 (1, 2)	60p	750	720	1850	1280

**Table 1–5 Level Meter Specifications**

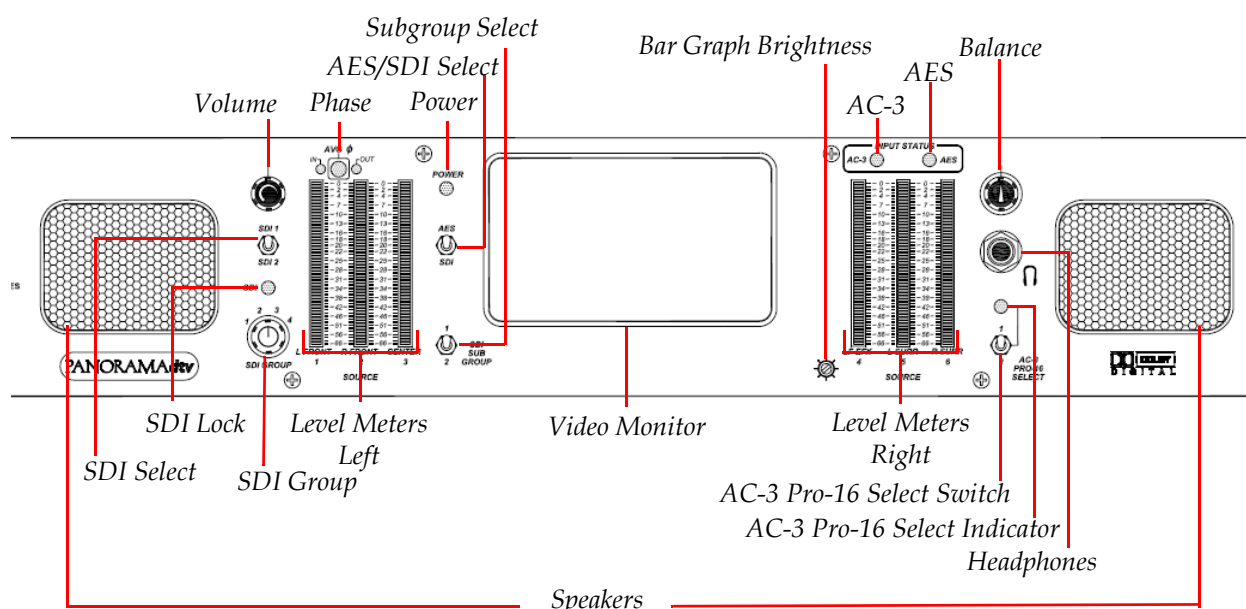
Specification	Values
Level Meter Type	Bar Graph
Segment Quantity	53
Level Meter Scale	0 to -66 dB
Dynamic Range	65 dB
Mid-scale Resolution	1 dB
Bar Graph Length	2.22" (56.4 mm)
Indication Accuracy	
+10 to -30 dB	± 0.2 dB
-31 to -39 dB	± 0.3 dB
-40 to -50 dB	± 0.5 dB
Segment Display Colors	Red, Green, Amber
Peak Emission Wave Length	Green=570 nm; Red=630nm

Table 1–5 Level Meter Specifications (Continued)

Specification	Values
Segment Brightness (20 mA)	3.5 cd/m <sup>2</sup>
Segment Brightness Uniformity	<10% difference between segments
Adjacent Segment "Off" Brightness	<1% of brightness of active segment
Segment Size	0.158" x 0.04" (4 mm x 1 mm)
Segment Pitch	0.039" (.99 mm)

## Front Panel Features

Figure 1–1 VAMP AC-3/M Front Panel



- Speakers:** The internal speaker system is comprised of two speakers: left and right. When monitoring six channels of audio, the left speaker channel reproduces a mix of audio Channels, 1, 3, and 5 (left front, left surround, and center) and the right speaker is a mix of Channels 2, 3, and 6 (right front, right surround, and center). Note that Channel 3 (center) is mixed to both left and right speaker channels and that Channel 4 (low frequency effects) is not reproduced through the speaker channels at all.

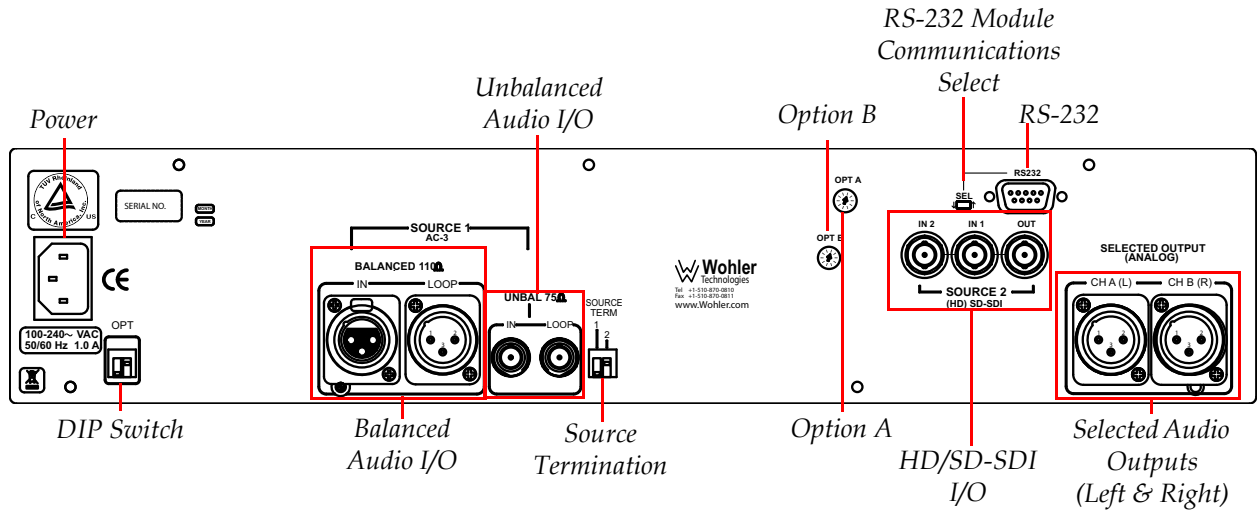
- **Volume Control** (Rotary Potentiometer): This knob controls the loudness of the audio reproduced by the internal speakers, external speakers, or connected headphone.
- **SDI Source Select** (Toggle Switch): This switch is used to select the HD/SD-SDI input source, IN 1 or IN2. Note that the SDI re-clocked output will output only the *selected* SDI source and the SDI lock LED indicates lock status of only the *selected* SDI source.
- **SDI Signal Lock Indicator** (Green LED): When the monitor receives a valid and locked SDI video signal, this LED lights green.
- **SDI Group Select** (Four-Position Rotary Knob): This control selects the SDI group (1, 2, 3, or 4) of the selected HD/SD-SDI source.
- **Phase Indicator** (Bi-Color Red/Green LED): The audio phase indicator shows the phase relationships between audio channels A (1) and B (2). The LED indicates the average phase condition by glowing green for in-phase conditions or red for out-of-phase conditions. While it is normal for stereo signals to contain some intermittent instantaneous out-of-phase and in-phase conditions (flickering red) a steady red glow of the phase indicator almost always indicates an out-of-phase alarm condition.
- **Audio Level Meters** (53-Segment Bar Graph): These six, high-resolution, LED bar graph meters display audio levels for metered audio signals. Ballistics for these meters are factory set to display a single floating PPM dot above a VU bar; each segment's color is fixed according to its position on the scale. Reference level is +4 dBu. Dynamic range for these meters is 65 dB.
- **Power Indicator** (Green LED): This LED glows green to indicate that the monitor is connected to mains power and an operation voltage is present.
- **AES/SDI Source** (Toggle Switch): This switch selects the digital audio source for monitoring, AC-3, AES (Source 1) or SDI (Source 2). when set to AES, the unit monitors the Dolby Digital (AC-3), AES, or PCM audio sources at the balanced or unbalanced Source 1 inputs. When set to SDI, the unit monitors the audio de-embedded from the selected HD/SD-SDI source at the Source 2 inputs.
- **SDI Sub-Group** (Toggle Switch): The switch is used to select one of two SDI sub-groups (1 or 2) of the selected SDI group of the selected HD/SD-SDI source to be monitored.

- **Video Monitor Screen** (LCD TFT): This screen 4.3" displays input video sources.
- **Bar Graph Brightness** (Recessed Trim Potentiometer): Turning this knob clockwise (requires a small slot screwdriver) increases the relative brightness of all bar graph LED segments. Turning it counter clockwise dims the LED segments.
- **AC-3 and AES Input Status Indication** (LEDs): These two green LEDs indicate the signal type received at the Source 1 inputs. When the unit is monitoring an AC-3 signal from a Source 1 input, the AC-3 LED glows green. When the unit is monitoring an AES signal from a Source 1 input, the AES LED glows green.
- **Balance Control** (Rotary Potentiometer): This control pans the volume balance between the left and right speakers. If you adjust the balance hard to the left or right, the system retains a slight Left/Right channel mix so phase discrepancies remain audible.
- **Headphone Jack** (1/4" Connector): Select the headphone audio sources as you would for the internal speakers. When you plug in headphones, the internal or external speakers will mute.
- **Pro-16 Selection Switch and Indication** (LED): In the event that you are processing two different Dolby digital Pro-16 data streams you can select between the two with this toggle switch. The LED will glow amber if these signals types are present. In the absence of these types of data streams, the LED will not be lit and the switch will be non-functional.

**Note:** Newer VAMP AC-3/M units do not include the Pro-16 switch.

# Rear Panel Connectors

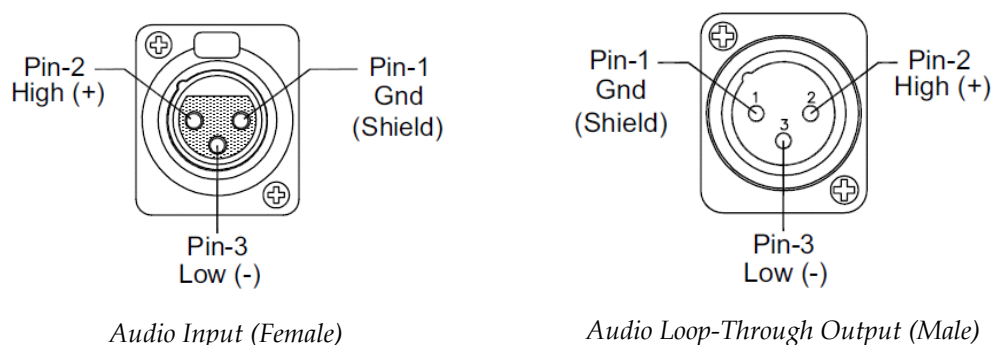
Figure 1–2 VAMP AC-3/M Rear Panel



- **Power** (IEC-320 Connector): Attach a standard IEC-320 power cord between this connector and the mains power. The front panel power LED glows green when an operating voltage is present.
- **OPT** (Four-Position DIP Switch): This DIP switch is reserved for future use. Disregard its settings.
- **Source 1 - AC-3/AES *Balanced* Input and Loop-Through Connectors** (XLR): The XLR female input connector (left) accepts either AC-3 (Dolby Digital®) or standard PCM or AES signals and is configured for balanced (110 Ω impedance) connections. Refer to [Figure 1–3 on page 14](#) for pin-out information. The male XLR connector (right) outputs a copy of the signal entering either the balanced or unbalanced input connector (whichever one is used). Use the **AES/SDI** source switch to select the **Source 1 AC-3** (AES) inputs for monitoring.

**Note:** Only one of the two **Source 1** inputs (unbalanced or balanced) may be used at a time.

**Figure 1–3 Three-Pin XLR Pin-Outs**



- Source 1 - AC-3/AES Unbalanced Input and Loop-Through Connectors (BNC-F):** This unbalanced input BNC connector accepts either AC-3 (Dolby Digital<sup>®</sup>) PCM or standard AES signals and is configured for unbalanced (75  $\Omega$  impedance) connections. The unbalanced loop output BNC connector outputs a copy of the signal entering either the balanced input or unbalanced input connector (whichever one is used).
 

**Note:** Only one of the two **Source 1** inputs (unbalanced or balanced) may be used at a time.
- Source 1 Termination (Four-Position DIP Switch):** In the event that signals entering the **Source 1** inputs are connected downstream equipment, then the left switch this DIP switch should be set to unterminated (up). Otherwise, if no downstream equipment is connected, then switch the left switch down (terminated). Currently, the right switch is not functional.
- OPT B Mode Select Switch (10-Position Rotary Switch):** This recessed, 10-position rotary switch sets the mode of operation. When set to 0, the unit is configured to download programming information. When set to 1, the unit will operate normally. Position 9 invokes a debugging mode.

**Table 1–6 OPT Switch Setting Functions**

Setting	Function
0	Program Download
1	Normal Operation
2 through 8	Not Used
9	Debug Mode

- OPT A Select Switch (10-Position Rotary Switch):** This recessed, 10-position rotary switch is reserved for future use. Ignore its setting.



- **Source 2 - HD/SD-SDI I/O Connectors (BNC):** The **In 1** and **In 2** BNC connectors accept either standard SD-SDI audio signals (270Mb/s) or high-definition HD-SDI (1.5 Gb/s). The **Out** BNC connector outputs a re-clocked HD/SD-SDI signal derived from the *selected* HD/SD-SDI input. This output functions regardless of other selection settings enabling output of the re-clocked HD/SD-SDI signal independent of the unit's other monitoring functions (as long as a valid HD/SD-SDI signal is present at the input). See [Table 1-7](#) below.

**Table 1-7 Audio Input Selection**

AES/ SDI Switch	SDI 1/2 Switch	SDI Group Switch	SDI Sub- Group Switch	Selected Input Channel
SDI	SDI 1	1	1	SDI 1 - 1 and 2
			2	SDI 1 - 3 and 4
		2	1	SDI 1 - 5 and 6
			2	SDI 1 - 7 and 8
		3	1	SDI 1 - 9 and 10
			2	SDI 1 - 11 and 12
		4	1	SDI 1 - 13 and 14
			2	SDI 1 - 15 and 16
	SDI 2	1	1	SDI 2 - 1 and 2
			2	SDI 2 - 2 and 3
		2	1	SDI 2 - 4 and 5
			2	SDI 2 - 7 and 8
		3	1	SDI 2 - 9 and 10
			2	SDI 2 - 11 and 12
		4	1	SDI 2 - 13 and 14
			2	SDI 2 - 15 and 16

- **Termination of DIP Switch:** In the event that signals entering the **Source 1** inputs are connected to downstream equipment, then the DIP switch section 1 of this module should be set to (up) unterminated. If the connector is not connected to downstream equipment, then it should be set to (down) terminated.

**Note:** Section 2 of this DIP switch is not functional.

- **RS-232 Module Communications Select (Push Button):** This two-position push button selects the video scaler (up) or the audio de-embedder (down) for communications through the RS-232 connector.

- **RS-232 (DB-9):** This connector is used for downloading programming, setup, and diagnostic information into and out of the audio de-embedded.
- **Selected Analog Audio Output (Channel A-Left and Channel B-Right; XLR-M):** The two **Selected Output (Analog)** male XLR connectors are analog outputs of the input signals as selected for active monitoring through the left and right speakers (or headphones). The left **CH A (L)** connector outputs the left speaker channel (Channel A) and the right **CH B (R)** connector outputs the right speaker channel (Channel B). Both connectors are configured for low impedance connections and the output signals are at unity gain with the input level and are not affected by the unit's Volume and Balance controls or headphone mute feature. (Refer to [Figure 1-3 on page 14](#) for pin-out information).

## Technical Functional Overview

[Figure 1-4](#) illustrates the overall functionality of the VAMP Series monitors.

Figure 1–4 VAMP AC-3/M Block Diagram

