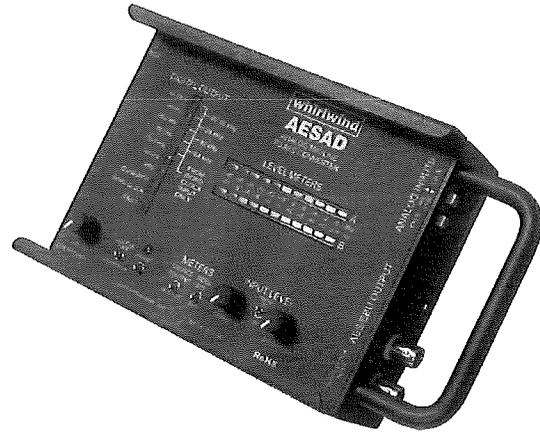


# whirlwind AESAD

PORTABLE MIC/LINE TO AES CONVERTER



## Description

The AESAD is a portable battery powered device for converting mic or line level analog audio into an AES/EBU digital audio stream. The AESAD has two high quality transformer based mic preamps and outputs a single, variable AES/EBU digital signal. The output sample rate is selectable by the user and a word clock input is provided for synchronization with other AES/EBU equipment. Metering is provided to monitor both the analog input and digital output signal levels. The AESAD also has a headphone output with level control, and will operate from 4 AA batteries or the supplied wall power supply. 48 Volt phantom power is available to power condenser microphones.

## Features

- Professional quality mic preamps based on the Lundahl 1538 transformer
- Portable
- Accepts a wide range of levels and is completely adjustable
- Up to 60 dB of gain on mic preamps
- Selectable sample rate
- 2 inputs each selectable for mic or line input
- 48 Volt phantom power selectable on each channel
- AES digital stream immune to ground loops
- Extremely low noise and low THD for professional use
- Rugged enclosure
- External word clock input for synchronization

## Theory of Operation

The AESAD was designed to provide a portable means of converting a line or microphone input to an AES-3 and S/PDIF digital audio stream. The audio inputs are balanced XLRs (one for the A channel, one for the B) with a pushbutton switch selecting between microphone and line level mode for each channel. Maximum input level for line mode is +18 dBV and -10 dBV for mic mode. The inputs are transformer isolated when in mic mode, and switch-selectable phantom power may also be applied to the inputs if required. When the switch is in line mode, phantom power is disconnected from the input connectors.

Each input has its own level control and metering. The level controls provide over 60 dB of adjustment range. Two 11-segment LED bars provide VU metering for each channel. Scaling is in 4 dB steps, and represents dB below clip. A switch selects between input and output level monitoring.

As a power saving measure, the VU meter display can be switch-selected between "dot" and "bar" mode- "dot" mode displays only a single LED on the meter, while "bar" mode displays the VU information as a bar graph.

The AESAD is very flexible in selecting the digital output's sample rate. A selector switch can choose from 44.1, 48, 88.2, 96, 176.4, and 192 kHz sample rates. In addition, an external word clock input is provided that allows the AESAD to automatically lock to any provided sample rate between 22 kHz and 216 kHz. When a valid word clock signal is received, the AESAD will display the standard AES-3 frequency that is closest to the incoming signal. If the incoming word clock signal is one of the frequencies that can be generated by the AESAD, the loss of the word clock signal results in no change of the output sample rate. However, if the word clock input is not one of the six generated by the AESAD, the sample rate will default to the last one selected by the SAMPLE RATE selector switch when the word clock input is removed.

The Channel/Status bits embedded within the AESAD's digital audio stream can be set for "Professional" use or for "Consumer" use with a switch selection. This same switch also controls selection of the output sample rate when the unit is not receiving a Word Clock input. Each momentary upward selection advances the sample rate to the next standard value. When the highest value (192 kHz) is reached, the next selection rolls over to the lowest value (44.1 kHz). If the switch is held in its upward position, the sample rates automatically and continuously scroll through the six available values. When the switch is returned to its center position, the digital output defaults to "Professional" use. To select "Consumer" use, set the switch to its downward position. Two digital audio outputs are provided: an AES-3 compatible 110 Ohm balanced XLR output, and an S/PDIF compatible 75 Ohm unbalanced BNC. These outputs are transformer isolated, and should NOT be used simultaneously. Output noise is less than -95 dBfs. Total harmonic distortion is less than 0.004% at 0 dBfs output. Output digital signal level is 5 Vpp. Frequency response is flat to within  $\pm 0.2$  dB from 22 Hz to 20 kHz.

A headphone monitor output is provided for convenience, with its own output level control. The setting of the headphone volume does not affect any other setting on the unit. Headphones between 16 and 100 Ohms impedance may be comfortably driven.

Power to the unit is provided by either 4 "AA" type cells, or through a coaxial power jack. The jack is a 5.5 mm by 2.1 mm, center positive. Input Voltage range is from 3.3 V to 15 V, allowing the unit to be powered from 5 or 6 Volt supplies, as well as from camera or car batteries. The supply should be capable of providing 6 Watts minimum.

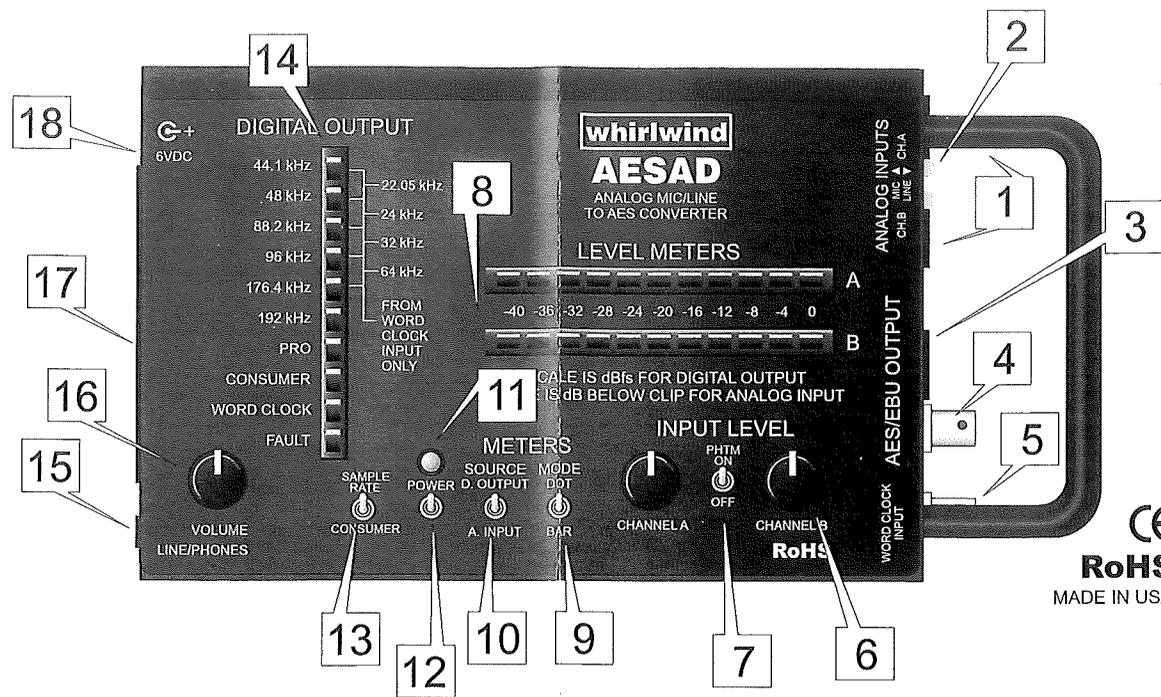
## Warranty

This product is guaranteed for one year from the date of purchase against manufacturing defects. For warranty service, return the unit, along with the original sales receipt, to: whirlwind, 99 Ling Road, Rochester, NY 14612, postage prepaid. We will repair or replace the unit at our option and pay the return postage.

**whirlwind**

MADE IN USA

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## Controls and Functions

1. The ANALOG INPUT jacks are balanced female XLR connectors accepting mic or line level signals; pin 1 is the signal ground, pin 2 is the positive input, pin 3 is the negative input, and the shell is grounded for added shielding. In MIC MODE, the inputs are transformer isolated and switch-selectable phantom power may be applied if required. In LINE MODE, the inputs are active balanced and phantom power is blocked from the input connectors. Maximum input level for line mode is +18 dBV and -10 dBV for mic mode.

2. The MIC/LINE input switches select between microphone and line level mode for each channel. When the switch is in line mode, phantom power is disconnected from the input connectors.

3. The AES/EBU digital output XLR jack delivers standard AES-3 or EBU digital audio signals over 110 Ohm balanced shielded cable. Pin connections are; pin 1 is signal ground, pin 2 is positive, pin 3 is negative, and the shell contact is grounded for additional shielding. Output digital signal level is 5 Vpp. This output is transformer isolated, and should NOT be used simultaneously with the S/PDIF BNC output.

4. The S/PDIF output is a 75 Ohm BNC female coaxial connector delivering standard S/PDIF or unbalanced AES/EBU digital audio signals. Output digital signal level is 5 Vpp. This output is transformer isolated, and should NOT be used simultaneously with the AES XLR output.

5. The WORD CLOCK input is a 75 Ohm BNC female coaxial connector that allows the AESAD to automatically lock to any provided sample rate between 22 kHz and 216 kHz. When a valid word clock signal is received, the AESAD will display the standard AES-3 frequency that is closest to the incoming signal. If the incoming word clock signal is one of the frequencies that can be generated by the AESAD, the loss of the word clock signal results in no change of the output sample rate. However, if the word clock input is not one of the six generated by the AESAD, the sample rate will default to the last one selected by the sample rate selector switch when the word clock input is removed.

6. The INPUT LEVEL controls independently control the amount of analog signal presented at the A to D converters, which can be monitored by the VU meters, set to monitor D. OUTPUT. The level controls provide over 60 dB of adjustment range.

7. The PHTM ON/OFF switch applies power (48 VDC) to the analog inputs when they are in the MIC position only.

8. The LEVEL METERS LED arrays serve as the (A) and (B) VU meters for both analog inputs and digital outputs. The scaling of the meters is dB below clip. Analog Inputs are metered directly at the input circuit, with clip at +18 dBV for line level inputs and -10 dBV for mic level inputs. The digital output level is monitored after the input level controls to visualize the amount of signal being sent to the converters, with clip at 0 dBfs, the point where the analog-to-digital converter's input clips. Step size for both sources is 4 dB.

9. The METERS MODE select switch controls how the VU meter information is displayed. In "DOT" mode, the VU display will illuminate the LED that most corresponds to the output level at that instant. In "BAR" mode, the VU display illuminates the LED corresponding to the instantaneous audio level, and all LEDs below it, thus operating as a conventional bar-graph LED display. The dot mode conserves power, allowing longer operation under battery power.

10. The METERS SOURCE select switch controls whether the level of the analog inputs or the AES/EBU output are selected for monitoring on the VU meters. When the switch is in the A. INPUT position, the level of the analog inputs is displayed. This display is as it is - the user has no control or adjustment of the input level. When the switch is in the D. OUTPUT position, the level present at the digital output XLR and BNC connectors is displayed. This display follows the setting of the input level controls which allows the user to accurately set the signal level for each channel.

11. The POWER indicator LED is illuminated when the power switch is ON. It will dim as the batteries lose power, thus giving an indication of remaining battery life.

12. The POWER switch applies power to the unit when the switch toggle is moved in the upward direction. When power is applied, the AESAD runs internal diagnostics, illuminating in an LED display test where the 32 LEDs in the three displays are illuminated in sequence, then extinguished in the same manner. The unit then goes into its normal operating mode.

13. The SAMPLE RATE select switch controls selection of the output sample rate when the unit is not receiving a word clock input. Each momentary upward selection advances the sample rate to the next standard value. When the highest value (192 kHz) is reached, the next selection rolls over to the lowest value (44.1 kHz). When the switch is returned to its center position, the digital output defaults to "Professional" mode. To select "Consumer" mode, push the switch to its downward position.

14. The DIGITAL OUTPUT LED display provides information about the AES/EBU signal being generated by the AESAD. The 10 segments are described as outlined below:

There are six LEDs for the display of SAMPLE RATE information. These six indicators correspond to the six commonly-used sample rates of 44.1, 48, 88.2, 96, 176.4, and 192 kHz. The AESAD can generate all six of these sample rates internally, and a single LED will illuminate next to the left-side legend corresponding to that sample rate. The presence of a word clock input adds four more possible sample rates: 22.05, 24, 32, and 64 kHz. These are displayed by illuminating two consecutive LEDs corresponding to the right-side legend. For example, if a sample rate of 22.05 kHz is detected, the top two LEDs in the array will be illuminated.

There are two LEDs for the indication of PROFESSIONAL or CONSUMER use of the Status/Control data embedded in the AES signal. In normal operation (excluding the power-on self-test display) only one of these LEDs should be illuminated.

A single LED displays whether or not a WORD CLOCK signal has been detected at the word clock Input jack. If the LED is illuminated, a word clock signal is present. Note that there can be a case where the word clock signal may be out of the range of the AESAD. If this is the case, there will be no sample rate indication. If the word clock signal is present and useable, a sample rate indication will also be present.

A single LED displays whether or not an internal FAULT has been detected by the self-test monitoring software within the unit. If this indicator is illuminated, correct operation of the unit is suspect. The unit's software will always attempt to provide an output regardless of the fault status.

15. The LINE/PHONES output jack provides an unbalanced monitor of the audio that is input to the AESAD. Peak output level is +4 dBV, and the output is capable of driving headphones from 16 Ohms to 100 Ohms impedance. It can also be used to feed an unbalanced line input. The level at this output is adjusted by the Line/Phones Volume control. This output is a standard unbalanced 3.5mm TRS (Tip-Ring-Sleeve) jack with the (A) left channel connected to the tip, the (B) right to the ring, and the sleeve is common.

16. The LINE/PHONES VOLUME Control adjusts the analog audio level present on the Line/Phones output 3.5mm TRS jack. The setting of this control only affects this jack.

17. The BATTERY COMPARTMENT is a slide out drawer that accepts four "AA" size cells. Either alkaline cells or externally-rechargeable Nickel-Metal-Hydride (NiMH) or Lithium-Ion cells may also be used. Battery life is highly dependent upon several factors, including phantom power use, output level, the use of headphones, and the mode of the level meters. Typical loading with phantom power on both inputs will provide about four hours of operation with fresh batteries. The AESAD does not have internal battery recharge capability.

18. The 6 VDC external power jack is a 5.5 mm x 2.1 mm size with the center contact wired positive and the barrel contact negative. When a plug is inserted into this connector, the internal batteries are disconnected. A 6 VDC 1 A plug-in power supply (#PS6) is supplied with the unit. Input Voltage can be anywhere from 4.8 VDC to 15 VDC, provided the power source can deliver at least 6 Watts peak. This wide input range allows the AESAD to be powered from lantern batteries, auto batteries, and camera batteries, as well as the familiar "wall wart" plug-in power supplies.