AD8 MANUAL 1.4

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AD8

Safety Information

Do not repair, modify, service this device except in the manner in which it is described in this manual. Doing so can endanger the user and others as well as void the warranty.

Fuses should be replaced with the exact values and sizes stated in the manual.

 JCF Audio, LLC accepts no responsibility for legal actions or for direct, incidental, or consequential damages that may result from improper installation, configuration, or use of the AD8.

Overview

The AD8 is an High-Resolution 8 channel Analog to Digital converter that features PEP technology, a completely new look at digital audio for **music**.

The unit transmits the industry standard AES/EBU protocol on four XLR connectors. Both the AES/EBU inputs (with AES input option installed) and AES/EBU outputs operate in single-wire mode exclusively at all sampling frequencies. The AD8 can derive its sync source from an **Int**ernal reference, a **Word** clock, a **S/Pdif** source (optical, or bnc), or **Option**ally an incoming AES/EBU stream.

The AD8 has eight analog inputs that are floating and approximately 2.8k. Pin 1 of all of the female XLR's on the unit are internally tied to circuit common. This should be kept in mind wiring systems together. The transformer coupled inputs can easily be interfaced with virtually any studio interconnection scheme while providing isolation and superb common-mode rejection figures essential for hostile (nearly all) studio environments. The device is pin 2 positive and although it is transformer coupled polarity should not be switched with unbalanced sources by feeding pin 3.

There are a number of digital input and output options that are available for loop processing that will be discussed in the Rear Panel section below.

0 dBu is referenced to 0.775 vrms for this manual

Front Panel Controls

Power - This LED indicates that the unit is on.

Level - These level adjustments control the sensitivity of the A/D input. The fully clock wise position provides no attenuation and the fully counter-clockwise position provides to 12-13 db of attenuation. Calibration level details are listed in the **Specifications** section.

Clock - This switch selects the clock source of the unit. The choices are Internal, Word, S/Pdif, and Option. Internal uses the on-board crystal oscillators to generate the selected frequency. (see Frequency section below) If Word is selected, the unit will expect a word clock input on the lower bnc jack on the rear of the unit. If S/Pdif is selected the unit will sync to the recovered clock from either the optical input jack or an AES/S/Pdif input stream from the top bnc jack. If Option is selected, the unit will sync to the recovered clock from the option input. (AES input #1/Analog input jack #5).

Data - This switch controls the main function of the AD8. If D/D PEP is selected, the unit will receive 8 channels of digital input from the option port, PEP process that data and then output that data on the AES outputs. The A/D section of the unit does not operate during this mode. If A/D PEP is selected, the analog inputs are converted to digital, then passed through the PEP process, and then output to the AES outputs. If A/D is selected, the analog inputs are converted to digital and then passed directly to the AES outputs.

Frequency - This switch selects the operating frequency of the unit. **This switch need to be set manually under all conditions to match the operating frequency regardless of the settings of both the Clock and Data switches.**

Sync error - This LED indicates that the sync source selected is invalid or that the Frequency switch may not match the selected reference.

Rear Panel

AC Power Inlet - This 3 pin IEC jack accepts 120VAC @ 50 or 60HZ. The unit is internally reconfigurable for 240VAC operation.

Word Clock Input - This BNC jack accepts a standard TTL level word clock input. The input is 75 ohm terminated and ground referenced. The input signal is well conditioned and doesn't really have a preference of shape or duty cycle.

Word Clock Output / Biphase input - This BNC jack is configured before shipping as a word clock output. This output will be a square wave at the sampling frequency selected. The output impedance is 75 ohms and will have a valid TTL level signal with a terminated line. This jack can alternatively be configured as an S/Pdif input for use as a sync source in place of the optical input. Email us for details on how to do that.

AES/EBU Outputs - These XLR outputs are 110 ohm, transformer-coupled standard sources. They will drive any reasonable amount of 110 ohm terminated cabling effectively. They are single-wire outputs under all conditions.

Opt I/O and Analog Inputs / AES inputs- These jacks are standard TOS connectors. The optical input jack will accept a 2 channel S/Pdif optical stream for use as a sync source up to 96k.

The optical output jack will output a 2 channel S/Pdif optical stream that mirrors any one port on the AES output XLRs.

Analog inputs 1-8 are floating 2.8k inputs (except 5-8 in D/D PEP are 110 ohm). The analog signals presented here pass to the input attenuators and then to the A/D converters. Analog inputs 5-8 do not go "through" relays.

With the factory AES input option card, analog inputs #5-8 become AES inputs #1-4 when either the option sync source OR the D/D PEP function is selected. If A/D or A/D PEP operation with an AES reference clock is required, the recommendation is that the top bnc jack be configured and used as the clock reference since Option sync will disable A/D conversion on #5-8. The AES inputs are standard 110 ohm transformer coupled and fully floating. Sync is derived from AES input #1 (Analog input #5).

Specifications

A/D Calibration Range

MIN	MAX
Level fully counterclockwise	Level fully clockwise
+30dBu = 0dBFS	+17dBu = 0dBFS
+4dBu = -26dBFS	+4dBu = -13dBFS
+12dBu = -18dBFS	-1dBu = -18dBFS

Unit ships with attenuator approximately at mid-adjustment range (+4dBu=-18dBFS)

De-emphasis is not supported anywhere in the AD8.

Power Consumption:
< 24 Watts

THD+N

(400Hz and 30k BW lim)

1kHz +4dBu yielding -18dBFS : <= -77 dB (.01%) all sampling frequencies

1kHz +14dBu yielding -8dBFS : <= -74 dB (.016%) all sampling frequencies

(30k BW lim)

20Hz +4dBu yielding -18.3dBFS : <= -69.5 dB (.025%) all sampling frequencies

20Hz +14dBu yielding -8.3dBFS : <= -69.5 dB (.025%) all sampling frequencies

Frequency Response (relative to 0 @ 1k)

44.1kHz :	20Hz -0.1dB
	20kHz -0.4dB
88.2kHz:	20Hz -0.1dB
	20kHz -0.4dB
	30kHz -0.7dB
	40kHz -1.2dB
176.4kHz	20Hz -0.2dB
	20kHz -0.4dB
	50kHz -1.7dB
	70kHz -5.0dB

Shipping weight

14 lbs. 30"X 24"X10"

Max Dimensions

L: 10.31″

W: 19″

H: 1.74″

Fuses: 2x 500ma 5x20mm, inside unit

1x 2A 5x20mm, inside unit

1x 1A, 3AG Fuse holder external

Notes:

The AD8 without PEP has lower group delay figures than most other A/D converters intended for multichannel audio applications.

x1 14 samples

x2 11 samples

x4 7 samples

Using PEP

As a function of PEP, the information that is available at the digital outputs cannot be synchronized to the analog inputs. We had considered extending the delay even further on purpose so that it would not be confused with something that is commonly presented as realtime like most modern audio workstation setups. Use of the AD8 without PEP has a lower group delay than other devices intended for the same purpose. Handling the latency with PEP engaged can be a small challenge but should be addressed.

The best way of providing realtime feedback to those who need it can only be accomplished one way. Not including latent devices like the AD8 using PEP in the loop. Careful consideration to whom needs realtime feedback and when should be considered as well. An affordable 8 channel analog mixer and some y-cabling will do the job perfectly well.

If this cannot be accomplished it is unfortunate but necessary to post-process using the PEP D/D function. We say unfortunate because the net result on sonics of the process is something that should be compensated for with decisions prior to processing. (See FAQ #2)

Alignment Effects

Users will notice digital peak level increases with program material using PEP. Users should avoid distorting program material unless that is the desire. Post-processing with PEP will **also** require 2 to 3 dB more peak headroom. Users may also find PEP's amazing ability to partially un-distort program material.

Overdubbing

Recording along with prerecorded material with PEP can be difficult without complex monitoring setups so our suggestion is to post-process overdubbed tracks and realign them either automatically or manually according to the following figures.

4098 samples in the x1 category

which is 92.87 ms at 44.1k

and is 85.33 ms at 48k

6147 samples in the x2 category

which is 69.64 ms at 88.2k

and is 63.98 ms at 96k

7170 samples in the x4 category

which is 40.64 ms at 176.4k

and is 37.34 ms at 192k

These are the figures that cover input to output in D/D PEP mode.

FAQS

1) What does PEP actually do to my audio files/waves?

We aren't telling you. There are plenty of smart folks out there who will be able to fig-ure it out.

2) Why don't don't we make PEP a plug-in?

It will encourage people to consider what they are monitoring and as of present day and for the future in view, the process is so computationally intensive it will not work without a dedicated processor for a number of channels commensurate with the AD8's intended use.

3) How can I use the AD8 with a laptop?

We designed the AD8 with an AES interface because it is a professional standard and open source. We will not be adding Firewire, USB or Thunderbolt to our boxes. How-ever, since we've been asked, there are two possible options to use the AD8 with less permanent installations.

1. The AD8 is compatible with the 2 ch. optical format that is common on lots of con-sumer electronic devices, laptops, desktops, etc. The choice of which 2 channel pairs of the AD8 come out of the optical output port is selectable by jumper internally.

2. If you want all 8 channels, the best solutions would be to convert the AES outputs to some other format. One solution might be a PCI(e) AES interface in a PCIe card adapter for a laptop. There even seem to be two PCIe -> Thunderbolt boxes that will be on the market soon. Now, these are not out yet, so we don't know for certain if this would work, but it just might be the ticket for a portable AES pro system. There are also some AES to Firewire solutions possible.

4) Can I have a schematic?

No. There is plenty of public domain information covering **similar** ideas. Details are everything.

Feature list

- PEP technology

- Ships with AES input option for 8 Ch. offline PEP processing

- Extremely low group delay without PEP engaged

- ~13dB front panel calibration range control

- No active analog electronics

- Cinemag analog input transformers

- JCF Audio standard high isolation power supply arrangements

- Very low power consumption

- 2 Year Limited Warranty

FCC Compliance:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

Warranty

JCF Audio 2-Year Limited Warranty

JCF Audio LLC. "JCF Audio" warrants this product to be free of defects in material and assembly for a period of two years for parts and labor from the date of original purchase. This warranty is enforceable only by the original retail purchaser and cannot be transferred or assigned without express permission of JCF Audio.

During the warranty period JCF Audio shall, at its exclusive option, either repair or replace free of charge any product that proves to be defective on inspection by JCF Audio or its authorized service representative. In all cases disputes concerning this warranty shall be resolved as prescribed by law. To obtain warranty service, the purchaser must contact JCF Audio to obtain instructions where to send the unit for service. All authorized returns must be sent to JCF Audio or an authorized JCF Audio repair facility postage prepaid, insured and properly packaged. This warranty does not cover claims for damage due to abuse, neglect, modification or attempted repair by unauthorized personnel, and is limited to failures arising during normal use that are due to defects in material or workmanship in the product.

Proof of purchase must be verified in the form of a bill of sale or some other positive proof that the product is within the warranty period upon JCF Audio's request.

JCF Audio reserves the right to update any unit returned for repair. JCF Audio reserves the right to change or improve design of the product at any time without prior notice.

Any implied warranties including implied warranties of merchantability and fitness for a particular purpose are limited in duration to the length of this limited warranty. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

JCF Audio will not be liable for incidental, consequential, indirect or other damages resulting from the breach of any express or implied warranty, including damage to property, damage based on inconvenience, downtime, loss of personal property, and to the extent permitted by law, damages for personal injury or death.

Some states do allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

This warranty only applies to products sold in the United States of America. The terms of this warranty shall only apply within the country of sale. Without limiting the foregoing, repairs under this warranty shall be made only by a duly authorized JCF Audio service representative or by JCF Audio itself. For warranty information in other countries, please refer to the dealer or distributor.