caddy

AD & DA CONVERTER

Multichannel AD & DA Converter

USER'S MANUAL
ED. 09/01

AENOR ER Empresa Registrada ER-080/1/96 AEQ A.E.Q., S.A., the manufacturer of this equipment, is a "Registered Company" by AENOR with reg. no: ER-080/1/96, in accordance with UNE standard EN - ISO - 9001

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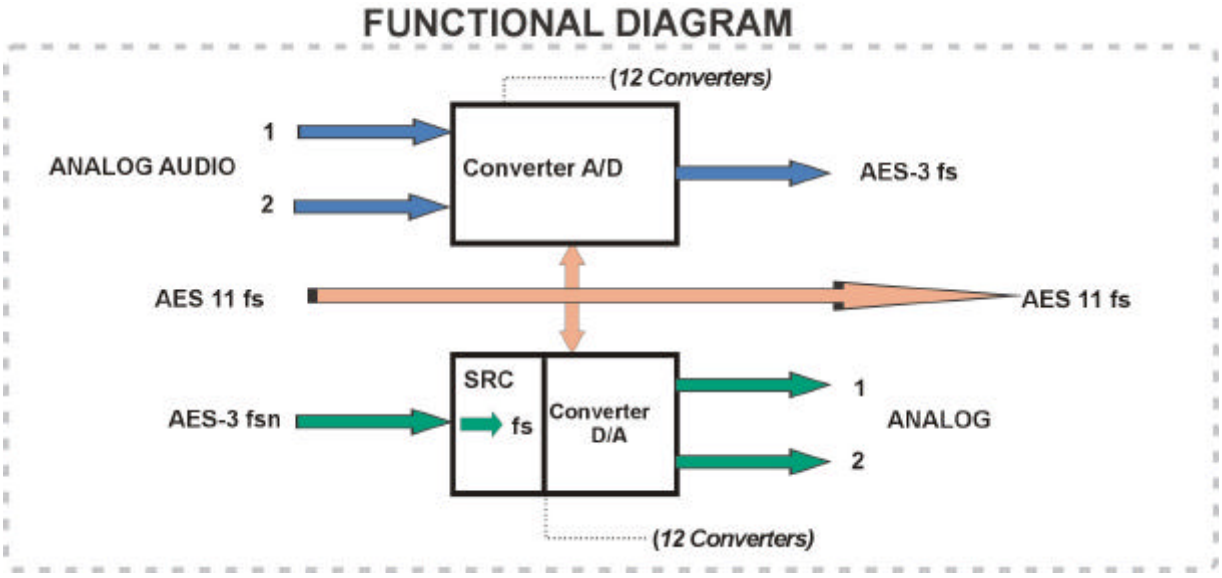
1. EQUIPMENT DESCRIPTION

1.1. Basic design concepts

The CADDY AD/DA converter includes, in a single-rack unit, 12 converters that transform 2 analog audio channels to one AES-EBU (AES 3) digital stereo audio channel, and 12 converters that transform one AES-EBU (AES 3) digital stereo audio channel to two analog audio channels.



1.2. Functional specifications:

It has excellent audio quality: 24 bits per sample, dynamic range greater than 100dB, audio distortion level (THD+N) less than –80dB, and analog audio level up to + 22dBu.

It has a sample rate converter (SRC) at all digital inputs, allowing AES-EBU signals with sample rates between 32 and 96kHz.

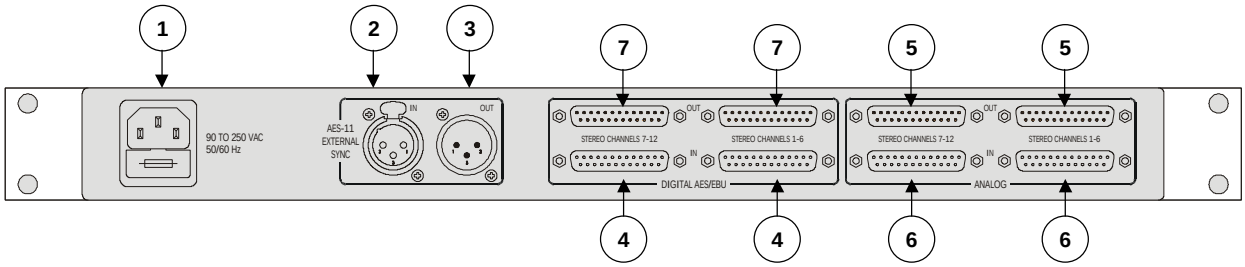
It has a high integration level: 12 each A/D and D/A converters in only one rack unit.

2. EQUIPMENT POWER SUPPLY

The equipment receives power through the connector designed for that purpose, using the cable supplied. The equipment may be operated with alternating voltage of between 90V and 250V at 50 or 60Hz. Maximum consumption is approximately 45W.

Activate the power switch (**ON** position). If all instructions have been correctly followed, the Power ON LED will light up, indicating that the equipment is receiving power.

3. DESCRIPTION OF BACK PANEL AND CONNECTION



1.- Power Supply Connector and Fuseholder.
2.- External Synch Input.
3.- External Synch Output.
4.- Digital Inputs for D-A Converters.
5.- Analog Outputs for D-A Converters.
6.- Analog Inputs for A-D Converters
7.- Digital Outputs for A-D Converters.

4. OPERATION

The CADDY basically converts 12 analog stereo signals to 12 AES-EBU digital stereo signals, and 12 AES-EBU digital stereo signals to 12 analog stereo signals.

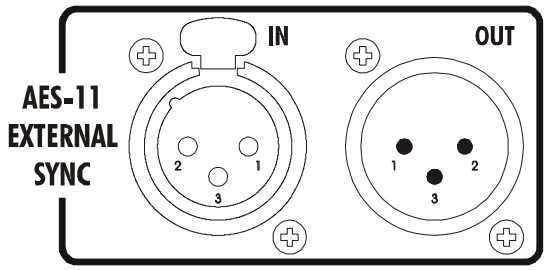
Internally, it always works with a resolution of 24 bits, both in A/D and D/A conversion.

4.1 Synchronism.

To perform all conversions, a sample rate must be established.

When the unit works independently, this rate is 48kHz. This means that the AES-EBU digital outputs will have a 24-bit/48kHz format.

However, the application may require this rate to be changed. The AES-11 external sync input allows the unit to work with a sample rate of 16kHz, 22.05kHz, 32kHz, 44.1kHz or 48kHz.



The AES-11 sync input signal connection is:

1 – GND
2 – SYNC IN+
3 – SYNC IN-

The AES-11 sync output connection allows conversion to be synchronized with another CADDY or another piece of equipment:

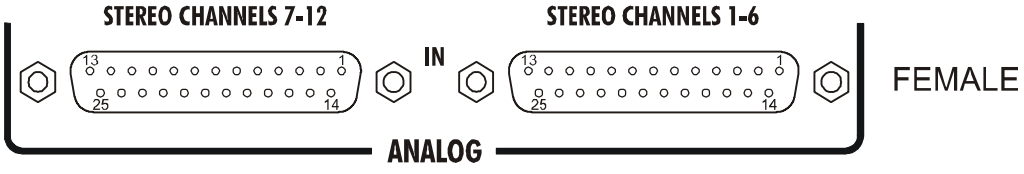
1 – GND
2 – SYNC OUT+
3 – SYNC OUT-

If several CADDY units are being used in the same system, even though they all work with a default of 48kHz, one will have to be used as a master and the rest with external sync to avoid jitter or lag in the conversion edges in the different units.

4.2 A/D Conversion.

In the A/D conversion stage, analog stereo audio signals are converted to AES-EBU 24-bit digital signals with the sample rate established by the external or internal sync signal.

The maximum input signal range to the converters is +22dBu. The input impedance is greater than 6Kohms, and balancing is electronic. The signals enter at two DB25 female connectors:



The analog input connections are:

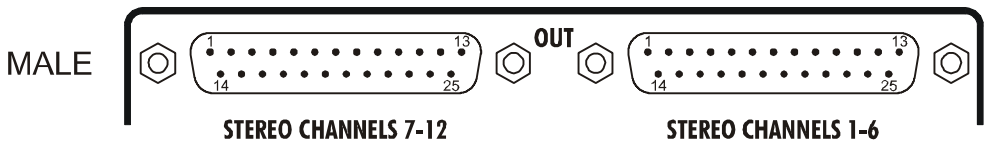
ANALOG IN STEREO CHANNELS 1-6

IN 1 L +	**PIN 1**
IN 1 L -	**PIN 14**
IN 1 R +	**PIN 2**
IN 1 R –	**PIN 15**
IN 2 L +	**PIN 3**
IN 2 L –	**PIN 16**
IN 2 R +	**PIN 4**
IN 2 R –	**PIN 17**
IN 3 L +	**PIN 5**
IN 3 L –	**PIN 18**
IN 3 R +	**PIN 6**
IN 3 R –	**PIN 19**
IN 4 L +	**PIN 7**
IN 4 L –	**PIN 20**
IN 4 R +	**PIN 8**
IN 4 R -	**PIN 21**
IN 5 L +	**PIN 9**
IN 5 L –	**PIN 22**
IN 5 R +	**PIN 10**
IN 5 R –	**PIN 23**
IN 6 L +	**PIN 11**
IN 6 L –	**PIN 24**
IN 6 R +	**PIN 12**
IN 6 R –	**PIN 25**
GND	**SHIELD**

ANALOG IN STEREO CHANNELS 7-12

IN 7 L +	**PIN 1**
IN 7 L -	**PIN 14**
IN 7 R +	**PIN 2**
IN 7 R –	**PIN 15**
IN 8 L +	**PIN 3**
IN 8 L –	**PIN 16**
IN 8 R +	**PIN 4**
IN 8 R –	**PIN 17**
IN 9 L +	**PIN 5**
IN 9 L –	**PIN 18**
IN 9 R +	**PIN 6**
IN 9 R –	**PIN 19**
IN 10 L +	**PIN 7**
IN 10 L –	**PIN 20**
IN 10 R +	**PIN 8**
IN 10 R –	**PIN 21**
IN 11 L +	**PIN 9**
IN 11 L –	**PIN 22**
IN 11 R +	**PIN 10**
IN 11 R –	**PIN 23**
IN 12L +	**PIN 11**
IN 12 L –	**PIN 24**
IN 12 R +	**PIN 12**
IN 12 R –	**PIN 25**
GND	**SHIELD**

The AES-EBU digital outputs corresponding to these inputs are obtained in two DB25 male connectors.



The digital output connections are:

DIGITAL OUT STEREO CHANNELS 1-6	
OUT AES 1 +	PIN 1
OUT AES 1 -	PIN 2
OUT AES 2 +	PIN 3
OUT AES 2 -	PIN 4
OUT AES 3 +	PIN 5
OUT AES 3 -	PIN 6
OUT AES 4 +	PIN 7
OUT AES 4 -	PIN 8
OUT AES 5 +	PIN 9
OUT AES 5 -	PIN 10
OUT AES 6 +	PIN 11
OUT AES 6 -	PIN 12
SHIELD	SHELL

DIGITAL OUT STEREO CHANNELS 7-12	
OUT AES 7 +	PIN 1
OUT AES 7 -	PIN 2
OUT AES 8 +	PIN 3
OUT AES 8 -	PIN 4
OUT AES 9 +	PIN 5
OUT AES 9 -	PIN 6
OUT AES 10 +	PIN 7
OUT AES 10 -	PIN 8
OUT AES 11 +	PIN 9
OUT AES 11 -	PIN 10
OUT AES 12 +	PIN 11
OUT AES 12 -	PIN 12

The format of these signals is AES-EBU 24-bit with 48KHz sample rate, or the one dictated by the external sync signal.

4.3 D/A Conversion.

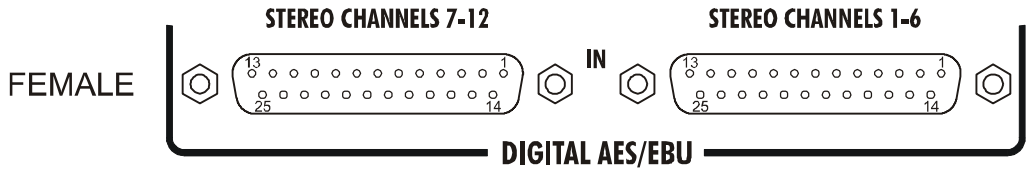
The 12 AES-EBU signals are converted to 12 analog stereo signals by means of D/A conversion.

It is important to know the sample rate used in these external signals and the internal work rate (default 48kHz).

External AES-EBU signals can arrive at the CADDY input with any sample rate, as CADDY has a sample rate converter circuit at each AES-EBU digital input, called SRC (sample rate converter).

In the optimum operating range, these SRCs can synchronize with rates that are three times higher or three times lower.
Thus, when working at 48kHz, the optimum range of sample rates for these signals would be between 48/3 = 16kHz and 48*3 = 144kHz.
AES-EBU signals with rates lower than 16kHz or higher than 144kHz will be converted, although some sporadic errors or faults may occur.

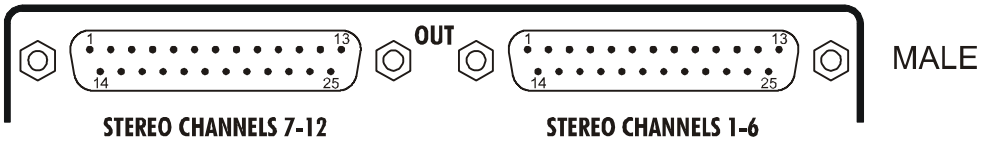
The AES-EBU digital inputs enter through two DB25 female connectors:



The digital input connections are:

DIGITAL IN STEREO CHANNELS 1-6		DIGITAL IN STEREO CHANNELS 7-12	
IN AES 1 +	**PIN 1**	**IN AES 7 +**	**PIN 1**
IN AES 1 -	**PIN 2**	**IN AES 7 -**	**PIN 2**
IN AES 2 +	**PIN 3**	**IN AES 8 +**	**PIN 3**
IN AES 2 -	**PIN 4**	**IN AES 8 -**	**PIN 4**
IN AES 3 +	**PIN 5**	**IN AES 9 +**	**PIN 5**
IN AES 3 -	**PIN 6**	**IN AES 9 -**	**PIN 6**
IN AES 4 +	**PIN 7**	**IN AES 10 +**	**PIN 7**
IN AES 4 -	**PIN 8**	**IN AES 10 -**	**PIN 8**
IN AES 5 +	**PIN 9**	**IN AES 11 +**	**PIN 9**
IN AES 5 -	**PIN 10**	**IN AES 11 -**	**PIN 10**
IN AES 6 +	**PIN 11**	**IN AES 12 +**	**PIN 11**
IN AES 6 -	**PIN 12**	**IN AES 12 -**	**PIN 12**
SHIELD	**SHELL**	**SHIELD**	**SHELL**

Once the signals have been converted into analog signals, they are obtained at two DB 25 male connectors:



The analog output connections are:

ANALOG OUT STEREO CHANNELS 1-6	
OUT 1 L +	PIN 1
OUT 1 L -	PIN 14
OUT 1 R +	PIN 2
OUT 1 R –	PIN 15
OUT 2 L +	PIN 3
OUT 2 L –	PIN 16
OUT 2 R +	PIN 4
OUT 2 R –	PIN 17
OUT 3 L +	PIN 5
OUT 3 L –	PIN 18
OUT 3 R +	PIN 6
OUT 3 R –	PIN 19
OUT 4 L +	PIN 7
OUT 4 L –	PIN 20
OUT 4 R +	PIN 8
OUT 4 R -	PIN 21
OUT 5 L +	PIN 9
OUT 5 L –	PIN 22
OUT 5 R +	PIN 10
OUT 5 R –	PIN 23
OUT 6 L +	PIN 11
OUT 6 L –	PIN 24
OUT 6 R +	PIN 12
OUT 6 R –	PIN 25
GND	SHIELD

ANALOG OUT STEREO CHANNELS 7-12	
OUT 7 L +	PIN 1
OUT 7 L -	PIN 14
OUT 7 R +	PIN 2
OUT 7 R –	PIN 15
OUT 8 L +	PIN 3
OUT 8 L –	PIN 16
OUT 8 R +	PIN 4
OUT 8 R –	PIN 17
OUT 9 L +	PIN 5
OUT 9 L –	PIN 18
OUT 9 R +	PIN 6
OUT 9 R –	PIN 19
OUT 10 L +	PIN 7
OUT 10 L –	PIN 20
OUT 10 R +	PIN 8
OUT 10 R –	PIN 21
OUT 11 L +	PIN 9
OUT 11 L –	PIN 22
OUT 11 R +	PIN 10
OUT 11 R –	PIN 23
OUT 12L +	PIN 11
OUT 12 L –	PIN 24
OUT 12 R +	PIN 12
OUT 12 R –	PIN 25
GND	SHIELD

5. TECHNICAL CHARACTERISTICS

- 24 physical analog audio inputs with electronic balancing.
- 24 physical analog audio outputs with electronic balancing.
- 12 AES-EBU (AES-3) physical digital audio outputs.
- 12 AES-EBU (AES-3) physical digital audio inputs with SRC.
- 1 AES-EBU (AES11) sync input and follower output.
- Default sample rate (fs): 48kHz.
- Standard allowable sample rate (fs) at sync input: 16kHz, 22.05kHz, 32kHz, 44.1kHz and 48kHz.
- Internal resolution: 24 bits per sample.
- Response frequency: 20-20,000 ± 1dB.
- Total harmonic distortion + noise@1KHz <- 80dB.
- Maximum analog audio level: + 22dBu.
- Analog input impedance>6Kohms.
- Analog output impedance: < 66ohms.
- Analog input connectors: DB25 female.
- Digital output connectors: DB25 male.
- Digital input connectors: DB25 female.
- Analog output connectors: DB25 male.
- Sync input connector: XLR female.
- Follower sync output connector: XLR male.
- Power supply: 85-264VAC 50/60Hz, 45W
- Format 1- 19" rack unit (482.6 x 44.5mm)

6. A.E.Q. GUARANTEE

A.E.Q. guarantees, for a one-year period from the date the equipment is acquired, the no-charge replacement of any part that is damaged or broken due to a manufacturing defect; said replacement will be done by A.E.Q.'s Technical Service Department at their premises, and the labor necessary to perform this replacement and the fine-tuning of the equipment is also included.

This guarantee does not include shipping, installation and start-up of the equipment, nor cleaning or the replacement of parts subjected to normal operating wear and tear.

Likewise, any defect or breakdown due to improper use of the equipment, or to manipulation or tampering with same by anyone other than our Technical Service personnel, is excluded from this guarantee.