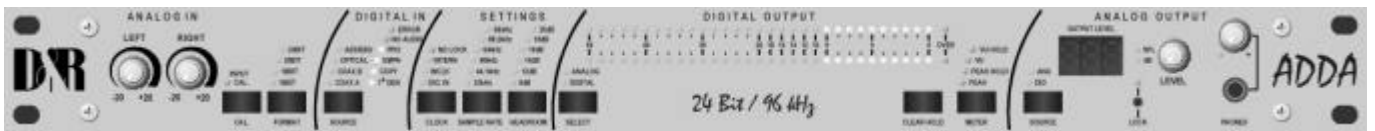


Operation Manual

ADDA

Analog-to-Digital And Digital-to-Analog Converter



We Love to create

Introduction

Dear Audio Professional,

Thank you for your purchase preference towards the D&R **ADDA**

The **ADDA** signal converter offers the premium quality-price ratio available on the market today. The conversion process takes place by a resolution of 24 bits and a sample rate of 96 KHz. This guaranties a minimum dynamic range of typically 117 dB. The high samplefrequency results in a ruler-flat frequency response, exceeding the limits of the physical audio spectrum.

Jan Betten and Anton Prins both responsible for the design of the Sirius and Scorpius broadcast consoles, have combined their expertise in digital audio technology. This resulted in a professional signal converter offering uncompromised performance and a extensive feature set.

Besides the complex process of signal conversion, the main focus of the **ADDA** is daily practice. Directly accessible buttons make operation plain and simple.

We are confident that you will be using the **ADDA** for many years to come, and wish you a lot of success.

With kind regards,

Duco de Rijk
PRESIDENT

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1 INTRODUCTION.

The ADDA is a high resolution Analog to Digital and Digital to Analog converter. Its concept originates from the top-range D&R broadcast consoles I/O units. It is designed to be used in demanding recording and broadcast applications, where the audio converters need to be 24 bit and sample rates up to 96kHz are a necessity.

Modern hard-disk recording systems deliver the kind of impressive performance and track capacity that can measure up to the best studio equipment available.

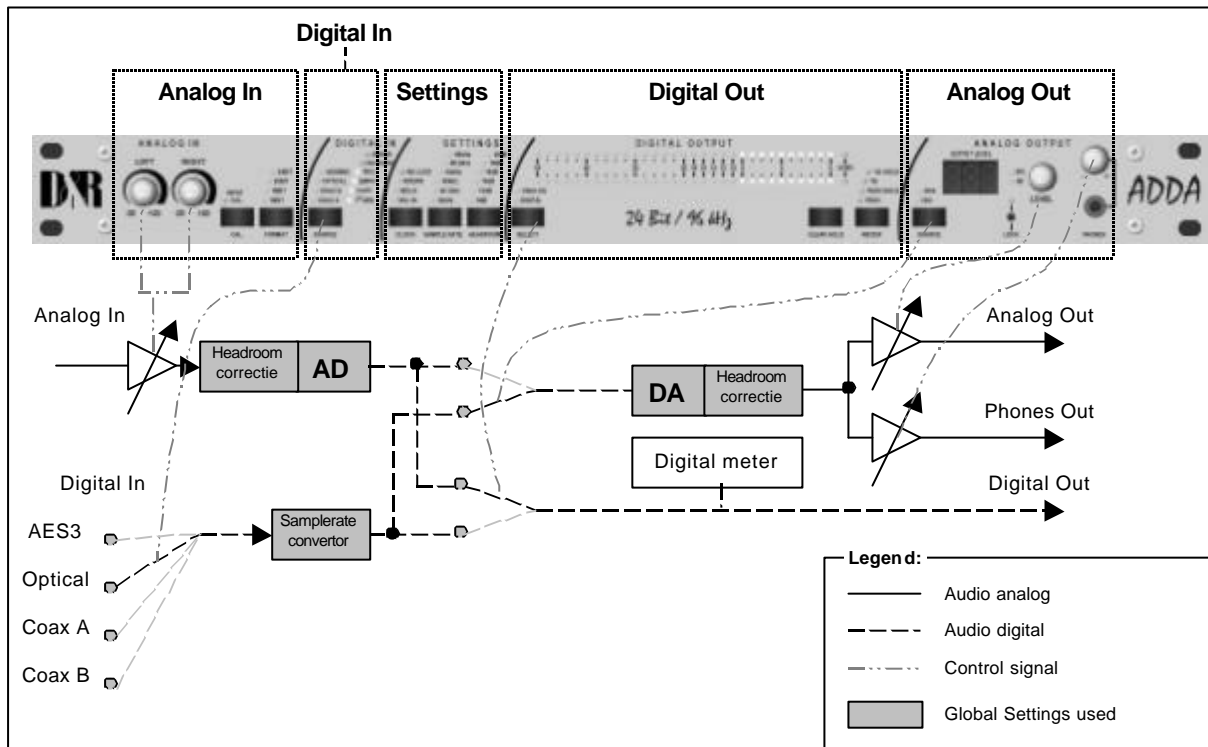
Nonetheless, the high quality of today's processing options can't be exploited to full effect when used with standard sound cards, because the A/D converters in these cards easily distort, and because interference generated from the clock frequencies inside the computer housing degrades the signal-to-noise ratio.

The remedy is to use a high-quality converter housed in an external device so that the signal can be patched into the computer/harddisk system without loss or hassle.

The ADDA Master converter is the answer to convert stereo analog signals into digital, the line input of the ADDA can be connected directly to the mixing console's output, thereby preserving the sound quality of the analog signals as well as their impressive dynamic range. From the ADDA's digital outputs, the signal would then be routed to a master recorder or to a digital I/O card. In addition, the ADDA is equipped with a Word Clock in/output of the type used for professional audio and broadcasting applications.

2 OPERATION

OVERVIEW



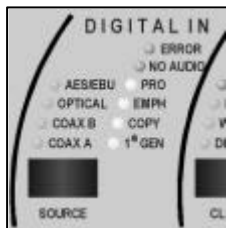
ANALOG INPUT



The analog input offers separated level control of the left and right channel. When the CAL. indicator is illuminated, the input level can be adjusted via the controls on the front panel. When the input CAL. is off, the gain controllers are disabled and the level is set to the studio's standard headroom level. This level is set by means of internal trimmers.

The format control allows you to set the bit resolution of the analog to digital conversion process. Each resolution involves an individually optimized, ingenious psycho-acoustic dither algorithm.

Digital Input



The digital in source selector allows you to switch between the four separated digital inputs of the ADDA. These four sources are: AES/EBU, Optical, Coax A and Coax B.

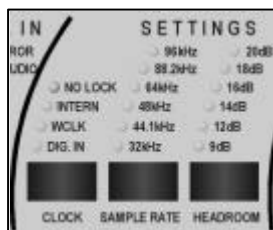
The indicators next to the source selector correspond to the status bits of the incoming data stream.

Error indicates that parts of the incoming data is not supported by the ADDA.

- No Audio indicates that the incoming stream is a non-audio stream, it could for instance be computer data or AC3-protocol data
- PRO represents the professional user status bit
- EMPH represents the emphasis status bit
- COPY represents the copy status bit
- 1° GEN represents the first generation status bit

Note: When the input signal has professional user status, the Copy and 1° GEN options are suspended.

SETTINGS



These settings apply to the conversion process.

The clock selection sets the digital output to be synced to the digital input, external word-clock or the internal clock.

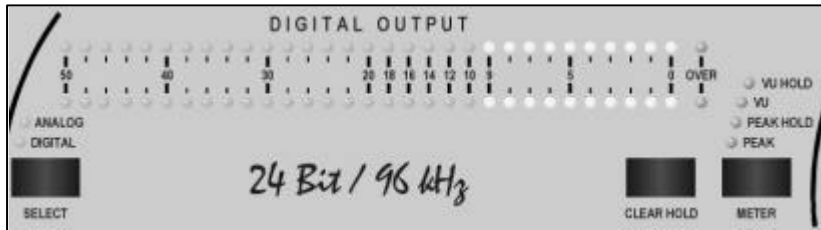
The No Lock indicator illuminates when the selected clock source does not provide a correct sync signal.

Obviously, the sample rate can only be set when the internal clock is assigned as clock source. The feasible sample rates are: 32 kHz, 44.1 kHz, 48 kHz, 64 kHz, 88.2 kHz and 96 kHz.

The Headroom selector allows you to easily interface digital and analog systems. There is a tricky thing between analog and digital leveling. Analog levels are often interpreted as averaged levels over a short period of time. In the digital domain however, the most crucial point is 0 dBFS, since this indicates that the dynamic range of the sample exceeds the available bit range of the digital medium.

Let's say your studio is leveled to +4dBu. This means when the VU meters on your console hit the 0 dB, the RMS level (voltage) on the output is +4dBu. Do realize that a +4dBu level indicates that the average level of the signal is situated around +4dBu, but it says nothing about the peak level that might show up. So where it comes down to is transferring our average leveled signal on to a medium that has an absolute limit in its dynamic range which should not be exceeded under any circumstance. When the ADDA detects an excess of the dynamic range the over-indicators will illuminate. Among others, the motion picture – and broadcast industry have standardized several headroom levels concerning digital audio. These standard levels are –9dB, –12dB, –14dB, –16dB, –18dB and –20dB. The headroom selection on the ADDA allows you to set the headroom level by means of one single button, eliminating the calibration of in- end output levels. A +4dBu level presented on the input is converted into the appropriate dBFS level, depending on your Headroom selection.

DIGITAL OUTPUT



This section allows you to set up the digital output of the ADDA.

The select button addresses the analog– or digital input as source for the digital output.

The Clear hold resets the peak level, held by the meter.

The meter button can set the meter to respond in:

- Peak
- Peak Hold
- VU
- VU Hold (The peak LEDs indicate the absolute peak level, and not VU peak.)

Note: The meter always represents the signal in dB full scale of the digital output.

ANALOG OUTPUT



The analog output is operated in the same way as the digital outputs. The source select enables you to address either the digital– or analog input.

The level potentiometer has an integrated switched encoder. This switch enables you to change the display between presenting a SPL level or custom dB type level.

The lock mechanism allows you to disable the front panels controls of the ADDA, for instance when operating in a fixed set-up.

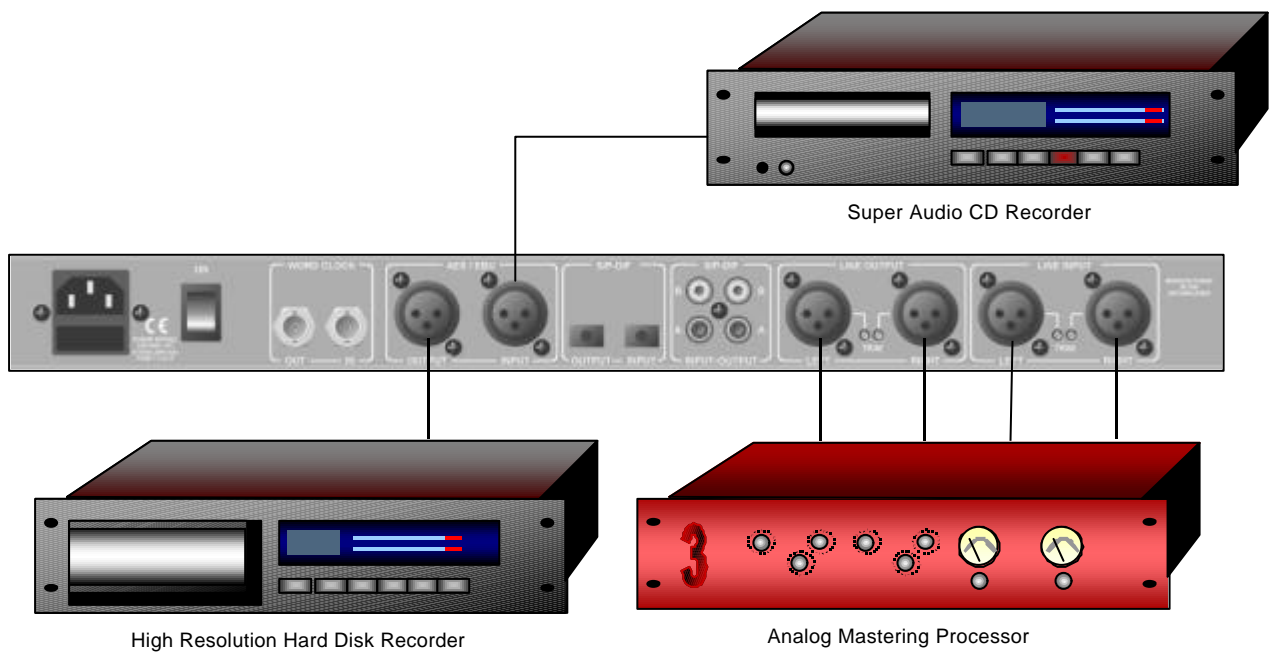
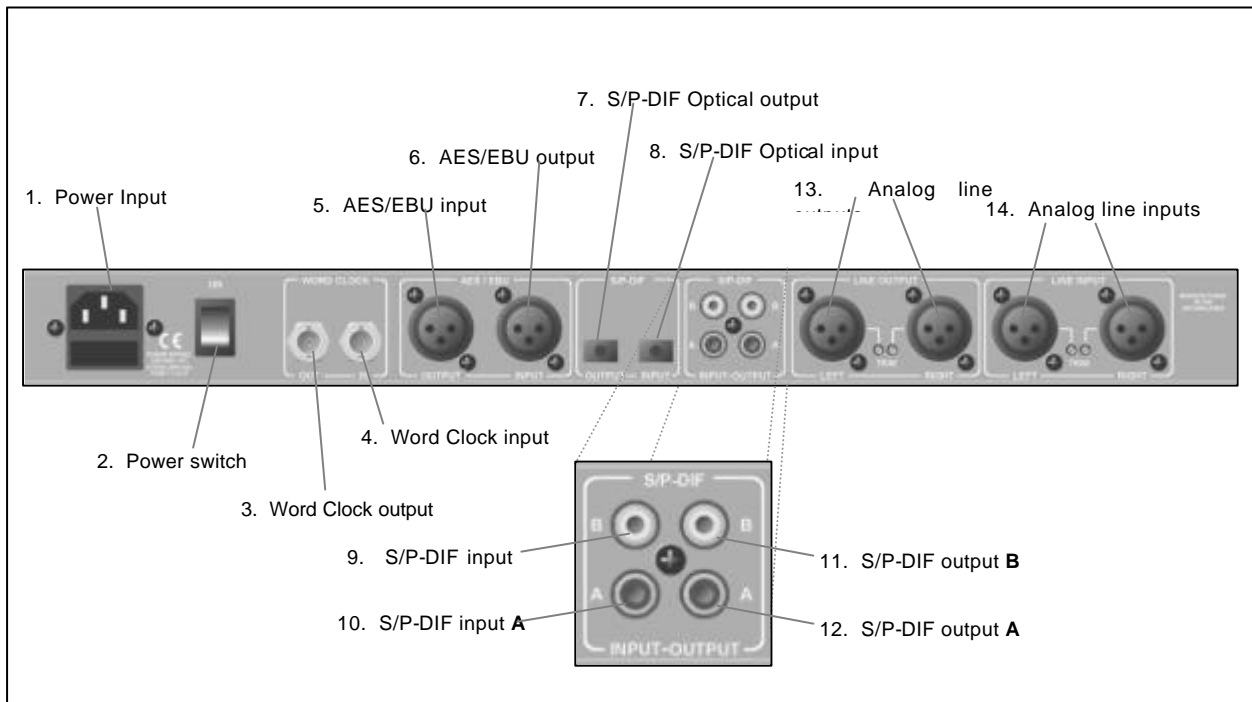
HEADPHONES OUTPUT



The headphones out presents the signal form the analog output. The output is powerful enough to drive any studio headphone set.

3 INTERFACING

OVERVIEW





4 SPECIFICATIONS

GENERAL SYSTEM PARAMETERS.

Level specs in dB full scale for digital and dBu for analog data.

0dBu=0.775Vrms

Sampling rate: 32kHz, 44.1kHz, 48kHz 64kHz, 88.2kHz, 96kHz +/- 20ppm (internally synchronised).

Headroom: internally floating and adjustable between 9 and 20dB for I/O to fixed point.

A/D and D/A CONVERTERS.

A/D Crystal 24 bit Delta Sigma, 128x over sampling

Dynamic range: typically 105 dB

THD+Noise: <-95dBFS

+4dBu / -10dBV

D/A Burr-Brown 24 bit delta-sigma converter.

Dynamic range: typically 106 dB

THD+Noise: <-96dBFS

+4dBu / -10dBV electronically balanced or optional transformers.

LINE INPUTS

Input sensitivity: -20dB to.+20dB

Line inp. bal 10kOhm +/- 20dB gain range.

CMRR: Line input max.. gain: 50Hz 50dB

DIGITAL INPUTS

AES/EBU (AES3), S/P-DIF, Optical (toslink)

16/20/24 bit, 32kHz to 96kHz (built in sample rate converter).

THD+N: -105dBFS @1kHz, 0dBFS

Frequency response: 20-20kHz, 0.1 dB

Input impedance: 110 Ohm (XLR) 75Ohm (cinch)

Clock input: 75Ohm TTL.

DIGITAL OUTPUTS.

AES/EBU/AES3, S/P-DIF, Optical (toslink) active at the same time.

16/20/24 bit, 32kHz to 96kHz (System clock or sample rate conversion to corresponding input clock).

Output level: 2 to 5 volt

Output impedance: 110 Ohm

Clock output: 75Ohm TTL.

CLOCK

System clock internally 32kHz, 44.1kHz, 48kHz, 20ppm.

Frame clock: BNC in/out 75Ohm TTL

Master clock: BNC in/out 75Ohm, TTL 256 frame clock

OVERALL:

Frequency response: 20-20.000 Hz

Crosstalk: less than -90dB

DIMENSIONS AND WEIGHT.

10 kg 22lbs

Dimensions: 483x250x44mm

Notes:

0dBu=775 mV.

All measurements were made on an



Audio Precision System Two Cascade.

For more info on this and many other broadcast consoles contact your nearest dealer or D&R HQ.

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Mail to: info@d-r.nl**

D&R reserve the right to change these specs at any time, due to new product improvements and new components.

DECLARATION OF CONFORMITY

Manufacturers Name: **D&R Electronica Weesp b.v.**

Manufacturers Address: **Rijkade 15B,
1382 GS Weesp,
The Netherlands**

Declares that the product

ADDA

conforms to the following product specifications:

EMC:	NEN-EN 55103-1	1995
	NEN-EN 55103-2	1995
	NEN-EN 55013-1	1994

Supplementary Information:

The products herewith complies with the requirements of the EMC Directive 89/336/EEC (1989) as amended by the CE Marking Directive 93/68/EEC (1993).

**D&R Electronica Weesp b.v.
Rijkade 15 B
1382 GS WEESP
The Netherlands
President of Engineering**

(*) The product is tested in a normal users environment.

PRODUCT SAFETY

PRODUCT SAFETY

This product is manufactured with the highest standards and is double-checked in our quality control department for reliability in the "HIGH VOLTAGE" section.

CAUTION

**Never remove any panels, or open this equipment. No user service-able parts inside.
Equipment power supply must be grounded at all times.
Only use this product as described, in user manual or brochure.
Do not operate this equipment in high humidity or expose it to water or other liquids.
Check the AC power supply cable to assure secure contact.
Have your equipment checked yearly by a qualified dealer service center.
Hazardous electrical shock can be avoided by carefully following the above rules.**

EXTRA CAUTION FOR LIVE MIC RECORDING

Ground all equipment using the ground pin in the AC power supply cable. Never remove this pin. Ground loops should be eliminated only by use of isolation transformers for all inputs and outputs. Replace any blown fuse with the same type and rating only after equipment has been disconnected from AC power. If problem persists, return equipment to a qualified service technician.

PLEASE READ THE FOLLOWING INFORMATION

**Especially in sound equipment the following information is essential to know.
An electrical shock is caused by voltage and current, actually it is the current that causes the shock.
In practice the higher the voltage the higher the current will be and the higher the shock.
But there is another thing to consider and it is resistance. When the resistance in Ohms is high between two poles, the current will be low and vice versa.
All three of these; voltage, current and resistance are important in determining the effect of an electrical shock.**

However, the severity of a shock primarily determined by the amount of current flowing through a person.

A person can feel a shock because the muscles in a body respond to electrical current and because the heart is a muscle it can affect, when the current is high enough. Current can also be fatal when it causes the chest muscles to contract and stop breathing. At what potential is current dangerous.

Well the first feeling of current is a tingle at 0.001 Amp of current. The current between 0.1 Amp and 0.2 Amp is fatal.

Imagine that your home fuses of 20 Amp can handle 200 times more current than is necessary to kill. How does resistance affect the shock a person feels. A typical resistance between one hand to the other in "dry" condition could well over 100,000 Ohm.

*Always earth all your equipment by the grounding pin in your main plug.
Proper wiring and isolation input/output transformers should only cure Humloops.*

Replace fuses always with the same type and rating after the equipment has been turned off and unplugged.

If the fuse blows again you have an equipment failure, do not use it again and return it to your dealer for repair.

And last but not least be careful not to touch a person being shocked as you, yourself could also be shocked. Once removed from the shock, have someone send for medical help immediately

Always keep the above-mentioned information in mind when using electrically powered equipment.

Dear owner,

In this preliminary manual we have tried to give you an overview of all that the ADDA has to offer. As it is our policy to continuously improve on our products this manual will be updated regularly. Please visit our web-site to upload the latest version of this manual. If you have any questions, do not hesitate to contact us.
We wish you many years of enjoyable mixing.

Best regards,

Duco de Rijk
President

Jan Betten
Chief designer

Anton Prins
Software engineer

Peter Wilcke
Lay-out engineer

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We hope you find this manual useful and easy to understand. As always, we are open to any suggestions about this manual or any D&R products.

Due to a policy of continuous product improvement, D&R reserves the right to change specifications and appearance without prior notice