



**16 Channel
AD/DA
ADAT
Converter**

**8 Channel
AD/DA
ADAT
Converter**



Manual

creamw@re[®]

fidelity at work.

A16 / A8 is manufactured by
CreamWare GmbH, Siegburg, Germany.
(C) CreamWare 1993-1998 - all rights reserved .

The following documentation, compiled by CreamWare Datentechnik GmbH (henceforth called CWDT), represents the current state of the product's development. The documentation is updated on a regular basis. Any changes which might ensue, including those necessitated by update specifications, are considered in the latest version of this documentation. CWDT is under no obligation to notify any person, organization, or institution of such changes or to make these changes public in any other way.

We must caution you that this publication could include technical inaccuracies or typographical errors.

CWDT offers no warranty, either expressed or implied, for the contents of this documentation or for the product described therein, including but not limited to the warranties of merchantability or the fitness of the product for any specific purpose.

In no event will CWDT be liable for any loss of data or for errors in data use or processing resulting from the use of this product or the documentation. In particular, CWDT will not be responsible for any direct or indirect damages (including lost profits, lost savings, delays or interruptions in the flow of business activities, including but not limited to, special, incidental, consequential, or other similar damages) arising out of the use of or inability to use this product or the associated documentation, even if CWDT or any authorized CWDT representative has been advised of the possibility of such damages.

The use of registered names, trademarks, etc., in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations (patent laws, trade mark laws. etc.) and therefore free for general use. In no case does CWDT guarantee that the information given in this documentation is free of such third-party rights.

Neither this documentation nor any part thereof may be copied, translated, or reduced to any electronic medium or machine form without the prior written consent from CreamWare Datentechnik GmbH.

This product (and the associated documentation) is governed by the CreamWare Datentechnik GmbH's General Conditions and Terms of Delivery and Payment.

Contents

Introduction	7
Operation	8
Using the A16 / A8 as Word Clock Master	8
Using the A16 / A8 as a Slave to an External Word Clock	8
The Mute Function	9
Levels	10
CLIP Indicator	11
Power Supply	12
A16 / A8 Technical Data	13
Disclaimer & Warranty	15



16 Channel
AD/DA
ADAT
Converter

8 Channel
AD/DA
ADAT
Converter



Manual

English

Introduction

Congratulations on your purchase of the A16 / A8! You now own an ultra-compact multichannel AD/DA converter.

Since the difference between A8 and A16 is only the number of I/O channels, we will combine this two products in one manual. The differences are put in parantheses, f.e. A16 (A8=...).

The A16 is capable of converting 16 analog audio channels to digital, and 16 digital audio channels to analog simultaneously. The multichannel digital connections are implemented using two ADAT-compatible I/O interfaces. ADAT interface 1 carries channels 1-8 while interface 2 carries channels 9-16. The analog inputs and outputs are equipped with switchable level adjustment.

The A8 is capable of converting 8 analog audio channels to digital, and 8 digital audio channels to analog simultaneously. The multichannel digital connections are implemented using one ADAT-compatible I/O interface. Also the A8 is equipped with switchable level adjustment.

The A16's / A8's audiophile quality combined with its safety Mute function assures its seamless integration into your professional studio environment.



This confirms that the A16 / A8 hardware satisfies the requirements in the (89/33/EWG) recommendations for limiting electromagnetic interference.

CreamWare Datentechnik, November 1997
Dr. Hans-Ulrich Hund

**ADAT is a registered trademark of Alesis*

Operation

The front panel contains the power switch, two buttons for **Synchronization** and **Sample Rate**, and 14 (A8=10) status indicators (LEDs).

The **red Power LED** indicates that the unit is operational after the power has been switched on. The **Synchronization button** lets you select the clock source from which the sampling frequency will be acquired. The **Sample Rate button** is used to select the sampling frequency when the A16 / A8 is in Master mode.

Using the A16 / A8 as Word Clock Master

The A16 / A8 is operating in Master mode when the **green LED indicator** lit.

In this mode, the A16's / A8's analog-to-digital converter (ADC) and digital-to-analog converter (DAC) are driven by a highly accurate and stable internal clock generator. The **Sample Rate button** selects the rate to use either **44.1kHz** or **48kHz**. The sample clock for the selected frequency is also available on the **Word Clock Out** BNC jack on the backside of the unit. Use this to synchronize additional digital audio devices to the A16 / A8.

Using the A16 / A8 as a Slave to an External Word Clock

If either the red or yellow LED indicators are lit, the A16 / A8 is operating in Slave mode. In this mode the sampling frequency can range anywhere from **38kHz** to **50kHz**.

The **Sample Rate button** has no effect in this mode, and the respective LEDs now serve to indicate the sampling frequency of the external word clock signal. If the incoming sampling frequency lies near 46kHz (between 44.1kHz and 48kHz) both frequency LEDs will be lit. This does not indicate a malfunction of any kind.

The **red Optical LED** indicates that the sampling frequency is derived from an ADAT signal and a wordclock signal is available at the **Word Clock Out** BNC connector. If no valid ADAT signal is found at either of the two (A8=one) ADAT inputs, the Frequency indicator will flash in red. In this case, the A16 / A8 is looking alternately at each input for a synchronization source. Only when a valid source is found will the corresponding eight-channel group be activated.

The **yellow Word Clock LED** indicates that the BNC **Word Clock In** jack is selected as the source for the sample clock. The incoming signal is also sent directly to the BNC **Word Clock Out** jack for the synchronization of additional devices. If no sampling frequency is detected at the input jack, the Frequency indicator will flash yellow.

The Mute Function

An essential function for an AD/DA converter in a professional studio environment is the ability to mute the output immediately if the digital data stream contains errors. In practice this can happen when, through an oversight, more than one device is defined as the Master device. The result can be a sudden high-energy digital impulse that produces output capable of damaging or destroying a speaker.

As a safety measure, the A16 / A8 employs an algorithm which continuously examines the integrity of the ADAT signals. If even a single data word error is detected, the outputs of the A16 / A8 are immediately muted. Only after at least 2.5 seconds of valid data have been confirmed will the outputs be restored. This protection is individually available for each ADAT input.

Levels

The A16 / A8 is equipped with symmetrically calibrated inputs and outputs which can also be used asymmetrically if desired. The **Input Sens.** and **Output Defeat** switches adjust the A16 / A8 I/O levels for different norms. The **input sensitivity** for each input can be increased by **+12dB**. The **Output Defeat** switch attenuates the output levels by **-12dB**.

Since the limiting factor for every AD/DA converters is determined by the largest representable numerical value, the stating of 'Nominal' levels, as is usual in analog technology, no longer applies. For an AD converter the question to be asked is: 'What is the maximum permissible input voltage before the numerical limit is exceeded?'. In digital systems the digital limit is indicated as **0dBFS** (Full Scale). In the following, all values are based on this level.

In digital systems you want to take advantage of as many 'bits' as possible to maximize the signal-to-noise ratio. Each bit corresponds to approximately 6dB. If a 16-bit converter is given a signal at a nominal level of +4dBu with a specified headroom of 15dB, the actual nominal +4dBu level will use only 13.5 of the 16 available bits. 2.5 bits are unused!

CLIP Indicator

The front panel provides 8 (A8=4) CLIP indicators for the 16 (A8=4) input channels. **Clip-LED 1** shows clipping on channels **1 or 2**, **Clip-LED 2** shows inputs **3 or 4**, etc. The CLIP indicator is triggered at a level of **-1.08 dBFS** to warn of clipping before it actually occurs. In practice this means that the input for a channel is optimally adjusted when the CLIP LED flashes only rarely. Then all available bits are used to provide the best signal-to-noise ratio.



Reference: The best signal-to-noise ratio is achieved when Level Defeat (Output defeat) is not enabled. You should use stereo (TRS) balanced connections to avoid working the outputs too hard. This also applies when an asymmetrical I/O mode is required. If you must use mono plugs, insert these only to the first position to use the non-inverted signal.

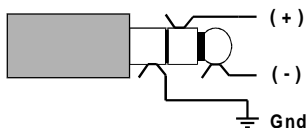


Fig. 1 Pin Assignment of the analog Inputs and Outputs

Power Supply

Always use the power supply delivered with your A16 / A8. Any other power supply can cause damage and/or signal degradation.

The red Power LED indicates the operational condition of the A16 / A8. If this is not lit, check the power supply. There are no fuses inside the A16 / A8 which has to be changed by the user in case of malfunction. The A16 / A8 is protected internally against thermal or electrical overload, and switches itself off automatically if either of these conditions exists. When the cause of a shutdown is eliminated, the A16 / A8 will resume normal operation automatically.

A16 / A8 Technical Data

Sample Rate	48 kHz, 44,1 kHz (Master) 38 kHz - 50 kHz (Slave)
Number of Channels A16 A 8	16 Inputs and 16 Outputs 8 Inputs and 8 Outputs
Analog Inputs	Stereo Jack 6.3 mm
Balanced	Input Sensitivity +10dBu (at 0dBFS) (Input Sens. Default) Input Sensitivity -2dBu (at 0dBFS) (Input Sens. +12 dB) Input Impedance 20k Ω
Unbalanced	Input Sensitivity +8dBV (at 0dBFS) (Input Sens. Default) Input Sensitivity -4dBV (at 0dBFS) (Input Sens. +12 dB) Input Impedance 10k Ω
Analog Output	Stereo Jack 6.3 mm
Balanced	Output Level +10dBu (at 0dBFS) (Output Defeat Default) Output Level -2dBu (at 0dBFS) (Output Defeat -12 dB) Output Impedance 600 Ω
Unbalanced	Output Level +2dBV (at 0dBFS) (Output Defeat Default) Output Level -10dBV (at 0dBFS) (Output Defeat -12 dB) Output Impedance 300 Ω
AD/DA-Converter	18 Bit $\Sigma\Delta$, 128times Oversampling

Performance

Analog - Digital	Frequency Response	< +/- 0.2dB (20Hz - 20kHz)
	Dynamic Range	> 96dB
	THD+N	0.003% typ.
	Channel Separation	> 100dB @ 997Hz
Digital - Analog	Frequency Response	< +/- 0.1dB (20Hz - 20kHz)
	Dynamic Range	> 96dB
	THD+N	0.004% typ.
	Channel Separation	> 95dB @ 997Hz
Analog - Analog	Frequency Response	< +/- 0.2dB (20Hz - 20kHz)
	Dynamic Range	> 96dB
	THD+N	0.005% typ.
	Channel Separation	> 90dB @ 997Hz

Digital Inputs and Outputs

In/Out Connection	4 * EIAJ-Optical (2 In, 2 Out)
Protocol	8-Channel, serial (ADAT)

Synchronization

Word Clock In	75 Ω, BNC
Word Clock Out	75 Ω, BNC

General

Voltage	18V - 21V DC
Power Consumption	25W
Dimensions	44,3*483*189,5mm (1HE)
Weight	3 kg

Disclaimer & Warranty

CREAMWARE GmbH (☐CREAMWARE“) warrants this product to be free of defects in materials and workmanship for a period of one (1) year for parts and for a period of ninety (90) days for labor from the date of original retail purchase. This warranty is enforceable only by the original retail purchaser.

To be protected by this warranty, the purchaser must complete and return the enclosed warranty card within fourteen (14) days of purchase.

During the warranty period CREAMWARE shall, at its sole and absolute option, either repair or replace free of charge any product that proves to be defective on inspection by CREAMWARE or an authorized service representative. In all cases disputes concerning the warranty shall be resolved as prescribed by law.

To obtain warranty service, the purchaser must first call or write CREAMWARE at the address and telephone number printed below to obtain a Return Authorization Number and instructions concerning where to return the unit for service. All inquiries must be accompanied by a description of the problem. All authorized returns must be sent to CREAMWARE or an authorized CREAMWARE repair facility postage prepaid, insured, and properly packaged. Proof of purchase must be provided in the form of a bill of sale, canceled cheque, or some other positive proof that the unit is within the warranty period. CREAMWARE reserves the right to update any unit returned for repair. CREAMWARE reserves the right to change or improve the design of the product at any time without prior notice. This warranty does not cover claims for damage due to abuse, neglect, alteration 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.

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.

IN NO EVENT WILL CREAMWARE BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES RESULTING FROM THE BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING, AMONG OTHER THINGS, DAMAGE TO PROPERTY, DAMAGE BASED ON INCONVENIENCE OR ON LOSS OF USE OF THE PRODUCT, AND, TO THE EXTENT PERMITTED BY LAW, DAMAGES FOR PERSONAL INJURY. Some states do not 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 or Canada. The terms of this warranty and any obligations of CREAMWARE under this warranty shall apply only within the country of sale. Without limiting the foregoing, repairs under this warranty shall be made only by a duly authorized CREAMWARE service representative. For warranty information in other countries please refer to your local distributor.

CREAMWARE, 446 Harrison St, Sumas, WA, USA 98295, 1-416-504-9969
support@creamware.com