DRAWMER

A2D2

DMS-3

AES GRADE 1 DUAL OUTPUT ANALOGUE TO DIGITAL CONVERTER

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ONE YEAR LIMITED WARRANTY

Drawmer Electronics Ltd., warrants the Drawmer DMS-3 A2D2, AES Grade 1 Dual Output Analogue to Digital Converter to conform substantially to the specifications of this manual for a period of one year from the original date of purchase when used in accordance with the specifications detailed in this manual. In the case of a valid warranty claim, your sole and exclusive remedy and Drawmer's entire liability under any theory of liability will be to, at Drawmer's discretion, repair or replace the product without charge, or, if not possible, to refund the purchase price to you. This warranty is not transferable. It applies only to the original purchaser of the product.

For warranty service please call your local Drawmer dealer. Alternatively call Drawmer Electronics Ltd. at +44 (0)1709 527574. Then ship the defective product, with transportation and insurance charges pre-paid, to Drawmer Electronics Ltd., Coleman Street, Parkgate, Rotherham, S62 6EL UK. Write the RA number in large letters in a prominent position on the shipping box. Enclose your name, address, telephone number, copy of the original sales invoice and a detailed description of the problem. Drawmer will not accept responsibility for loss or damage during transit.

This warranty is void if the product has been damaged by misuse, modification or unauthorised repair.

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Some states and specific countries do not allow the exclusion of implied warranties or limitations on how long an implied warranty may last, so the above limitations may not apply to you. This warranty gives you specific legal rights. You may have additional rights that vary from state to state, and country to country.

For the USA

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off an on, then the user is encouraged to try to correct the interference by one or more of the following measures:

Re-orient or relocate the receiving antenna.

Increase the separation between the equipment and the receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Unauthorised changes or modification to this system can void the users' authority to operate this equipment.
This equipment requires shielded interface cables in order to meet FCC class B limit.

For Canada

CLASS B NOTICE
This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications.

CLASSE B AVIS
Cet appareil numérique ne dépasse pas les limites de la classe B au niveau des émissions de bruits radioélectriques fixés dans le Règlement des signaux parasites par le ministère Canadien des Communications.

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AES GRADE 1 DUAL OUTPUT ANALOGUE TO DIGITAL CONVERTER

SAFETY CONSIDERATIONS

CAUTION - MAINS FUSE

TO REDUCE THE RISK OF FIRE
REPLACE THE MAINS FUSE ONLY WITH
A FUSE THAT **CONFORMS TO IEC127-2.**
250 VOLT WORKING, TIME DELAY TYPE
AND BODY SIZE OF 20mm x 5mm.
THE MAINS INPUT FUSE MUST BE
RATED AT 230V=T80mA and 115V=T160mA.

CAUTION - MAINS CABLE

DO NOT ATTEMPT TO CHANGE
OR TAMPER WITH THE
SUPPLIED MAINS CABLE.

CAUTION - SERVICING

DO NOT PERFORM ANY SERVICING.
REFER ALL SERVICING TO QUALIFIED
SERVICE PERSONNEL.

WARNING

TO REDUCE THE RISK OF FIRE OR
ELECTRIC SHOCK DO NOT EXPOSE
THIS EQUIPMENT TO RAIN OR MOISTURE.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

In the interests of product development, Drawmer reserve the right to modify or improve specifications of this product at any time, without prior notice.

DRAWMER *A2D2*

DMS-3: AES GRADE 1 DUAL OUTPUT A/D CONVERTER

INTRODUCTION

Microphones are analogue, speakers are analogue, storage is mostly digital and signal processing can be either analogue or digital, software or hardware based. At some point in the signal path, a high quality Analogue-to-Digital converter is required, which faithfully reproduces analogue signals in the digital domain. Step up the Drawmer A2D2...

The A2D2 is a stereo A/D converter giving simultaneous dual stereo outputs at different selectable sample rates from 44.1kHz to 192kHz - so it is possible to have a main output at, say 192kHz with another at 44.1kHz as a low resolution copy.

Features:

Dual input configuration allows either a fully variable input level from -2dBu to +28dBu via front panel rotary controls or 24 turn precision presets for a fully calibrated input.

Accurate 24 segment peak reading LED bar meters show incoming signal levels from -50dBfs to 0dBfs plus separate overload LEDs.

Each digital output has selectable word length of 16 or 24 bits, with automatic dither generation.

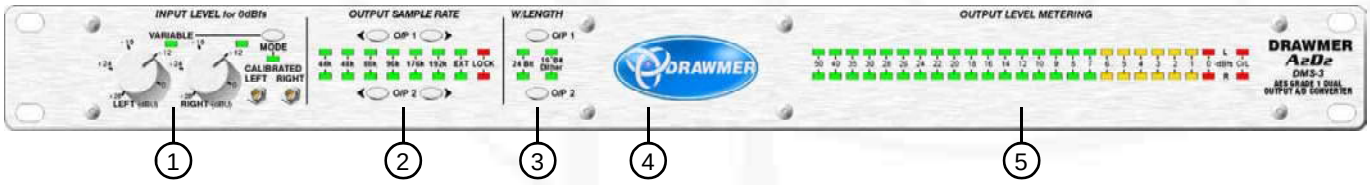
The internal low jitter clock generator is Grade 1 AES standard.

External clock input.

3 word clock outputs to allow the A2D2 to act as master clock generator.

Burr Brown analogue input stages.

The A2D2 uses a linear power supply to minimise interference with the internal clocks.



1 Input Level for 0dBfs:
Two input level modes are available: In installations with fixed input levels, **Calibrated**, recessed left/right, 20 turn pots give precise input levels where very little setup is required. In situations where adjustments have to be made "on the fly" standard **Variable** left/right controls are provided.

2 Output Sample Rate:
Independantly sets the sample rates for **Output 1** (7) and **output 2** (8) from **44kHz** through to **192kHz**, plus **EXT** clock (9). A **lock** led shows the strength of the incoming external clock.

3 Word Length:
Independantly sets the **Word Length of Output 1** (7) and **output 2** (8) to either **16 bit Dither** or **24 Bit**.

4 On Led:
A LED to show that the unit has power.

5 Output Meter:
V.U. output meter with 24 segment LED per channel plus Overload - ranging from -50dB to 0 db.

6 Analogue Input:
Individual Left/Right Balanced analogue inputs.

7 Digital Output 1:
One each of ***S/PDIF***, ***TOSLINK*** *or* ***AES*** simultaneous outputs. The sample rate is selected via (2).

8 Digital Output 2:
One each of ***S/PDIF***, ***TOSLINK*** *or* ***AES*** simultaneous outputs. The sample rate is selected via (2).

9 Wordclock Input:
The **EXT Wordclock** input for both sample rate converters.

10 Wordclock Outputs:
Three wordclock outputs provided. The sample rate is determined by O.S.R.1(2).

11 IEC and Fuse:
The mains IEC inlet and fuse holder.

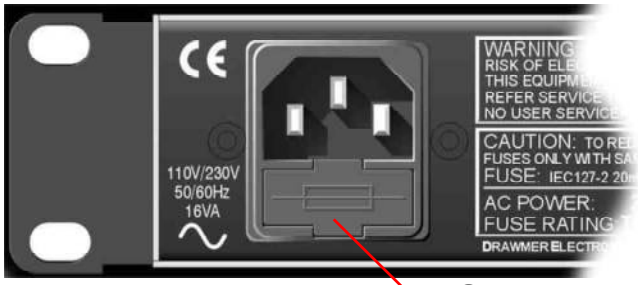
INSTALLATION

The DMS-3 is designed for standard 19" rack mounting occupying 1U of rack space. Avoid mounting the unit directly above power supplies or amplifiers that radiate significant amounts of heat. If the unit is to be used in a mobile situation, it is strongly recommended that the rear of the unit is supported in the carrying rack to avoid bending the front panel rack mounting 'ears'. Use fibre or plastic washers to prevent the front panel becoming marked by the mounting bolts.

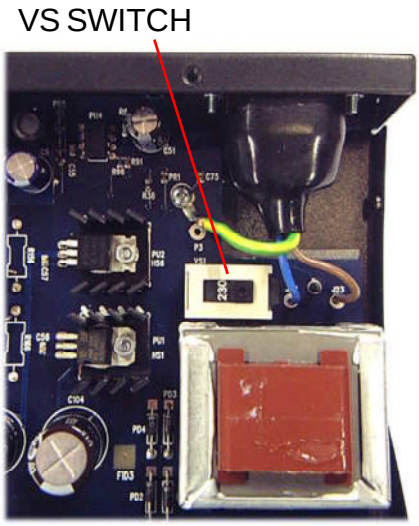
POWER CONNECTION

The A2D2 will be supplied with a power cable suitable for domestic power outlets in your country. For your own safety, it is important that you use this cable to connect to the mains supply earth. The cable must not be tampered with or modified.

The power supply socket has an integral fuse drawer containing the power fuse of the same value, to suit the mains voltage for which the unit has been supplied. Removal of the drawer is only possible with the power cord removed. The fuse should never blow under normal operation. If the fuse is suspected of having blown, then a fault will have occurred and this fault condition should be inspected by a qualified service engineer. When replacing the fuse, always comply with the Safety Instructions.



If the unit is to be used with a mains input operating voltage different to that for which the unit is supplied, the following procedure must be carried out by a technically competent person, *(see following diagram)*



1: Disconnect the unit from the mains.

2: Using a number 1 size pozidrive screwdriver, remove the nine self -tapping screws that retain the top cover. Five screws are located on the top cover; and two screws on either side. Slide off the cover.

3: Inside the unit slide the voltage change-over switch **(VS1)** until the correct (or nearest) mains input voltage is visible on the switch actuator.
(see fig.4)

4: Replace the cover and the nine screws.

5: In the fuse draw change the fuse to suit the following values:
For **230 V**olt operation alter the fuse to a similar type rated at **T80mA.**
For **115 V**olt operation alter the fuse to a similar type rated at **T160mA**.

AUDIO CONNECTIONS

Analogue Inputs
The preffered inputs to the A2D2 are electronically balanced and would normally be connected to your system via a patchbay. Should unbalanced operation be required, simply ground pin 3 on the XLR connectors.
If earth loop hum problems are encountered, **do not** disconnect the mains earth but instead, try disconnecting one end of the signal screen on the cables connecting the A2D2 to the patchbay. If such measures are necessary, balanced operation is recommended.

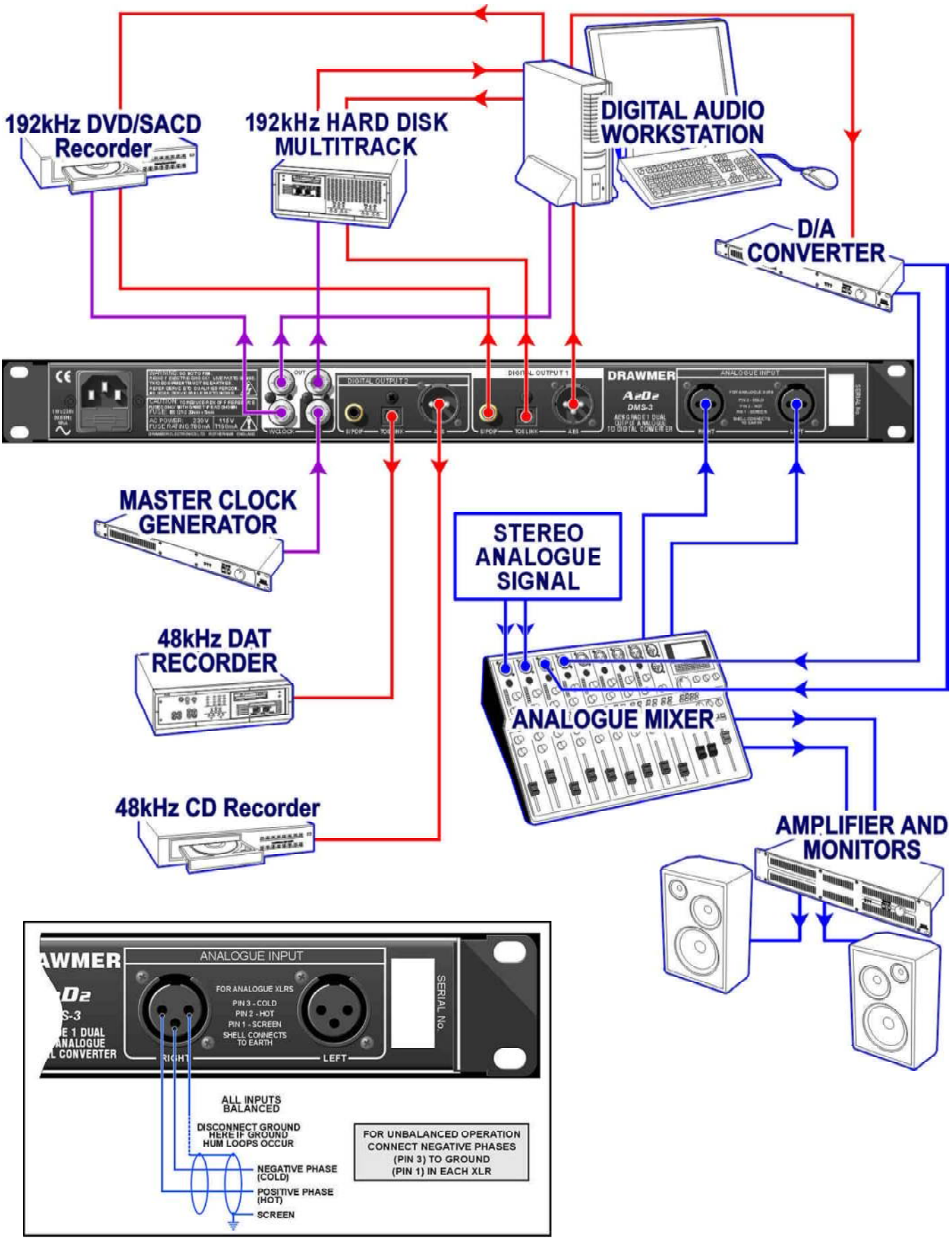
AES Input
Via an XLR connector designed to be used with standard balanced microphone cable (20 metres maximum), wired pin 1 screen, pin 2 and 3 balanced data, and the XLR shell connected to the chassis. Having many short cables joined together is not advisable as each connector can cause undesirable signal reflections.
The output socket fully conforms to the EMC standards; if the unit is to be used where it may be exposed to high levels of disturbance, such as found close to a TV or radio transmitter, it is suggested that the screen of the data cable be connected to the chassis connection on the XLR type connector rather than to pin 1.
If ground loop problems are encountered, never disconnect the mains ground, but instead, try disconnecting the signal screen on one end of each cable connecting the outputs.

S/PDIF Input
Via a high quality RCA type phono jack where the data conforms to the Sony **J** Phillips **J** Digital InterFace format. Because this connector only provides an unbalanced termination, the recommended maximum length for this cable is 3 metres, even with very high quality cable.

TOSLINK (or EIAJ)
The real benefit of TOSlink is that it is not susceptible to electromagnetic noise, however, it is highly recommended that a very good quality cable is used as the plastic conductors used in cheap cables can damage data. Additionally performance is compromised over long lengths of cable, as the signal strength weakens due to impurities in the conductive material, therefore lengths of no longer than five metres are recommended unless using a signal booster..
Though the connectors are the same TOSLink and ADAT Optical are not compatible with each other.

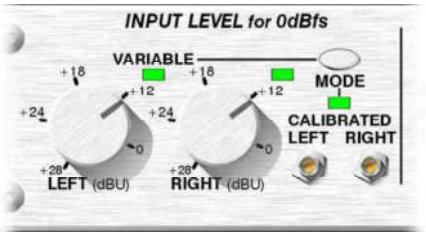
Word Clock
Use only good quality digital or video coax (not aerial downlead) cable for the word-clock signals, terminated with the correct type of 75Ω BNC connectors - inferior cables will introduce jitter and will completely undermine the performance benefits which might be achieved by using a master clock in the first place!

SIMPLE CONNECTION GUIDE



CONTROL DESCRIPTION

The Drawmer DMS-3 A2D2 has been meticulously designed to faithfully, and transparently recreate your analogue signal in digital in as simple and intuative method as possible. A high quality Burr Brown input stage has been incorporated, coupled with the AES Grade 1 digital converted outputs, making the A2D2 perfect for recording, mastering and post-production from all of your analogue to digital devices. The analogue input is fed simultaneously to two seperately controlled outputs both in AES/EBU, SPDIF and TOSLINK formats enabling a backup copy to be made of the signal, as well as solving any connectivity problems and allowing signal distribution.

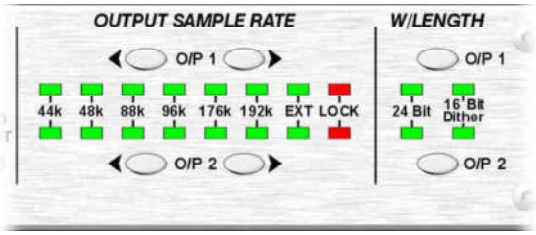


INPUT LEVEL for 0dBfs

MODE One switch toggles between **Variable** and **Calibrated** modes of input level gain.

VARIABLE In situations where the input levels can vary from place to place, such as in outside broadcasts, or live venues, a variable input level has been provided, with accurate individual left/right control, to provide quick setup. This ranges from +28dBU to 0dBU.

CALIBRATED In the studio, where input and output levels will be calibrated and under better control, a calibrated input gain option has been provided, in the form of very accurate (24 turn) left/right potentiometers ranging from +28dBU to 0dBU. These require a small screwdriver to operate and so once set are less likely to be accidentally adjusted.



Output Sample Rate

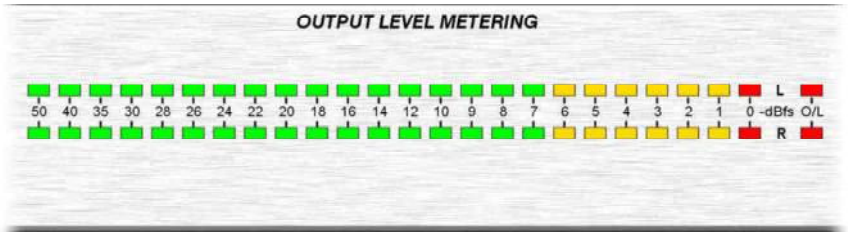
The A2D2 has dual independant stereo digital outputs at different selectable sample rates from 44.1kHz to 192kHz - so it is possible to have a main output at 192kHz with another at 44.1kHz as a low resolution copy.

O/P 1 The outgoing sample rate for O/P1 of the DMS-3 can be set using the two sample rate switches on the top row - the left moving down rate and the right moving up, with a corresponding LED being lit to show the current sample rate. The DSM-3 generates six Ultra Low Jitter sample rates - 44.1k, 48k, 88.2k, 96k, 176.4k and 192k, all stable to <1ppm, and in addition can also operate at the sample rate generated by an external source. With the Leds set to EXT the sample rate is set by the Wordclock input (as located on the rear panel). A lock LED is provided on the front and operates when the EXT clock signal is strong.
O/P 1 also sets the sample rate of the three wordclock outputs on the rear panel.

W/Length The top switch provides either 16 Bit Dither or 24 Bit operation for O/P1.

O/P 2 The outgoing sample rate for O/P2 can be set using the two sample rate switches on the bottom row and operates in exactly the same way as with O/P1. When on EXT the sample rate is set using the same Wordclock input as with O/P1.

W/Length The bottom switch provides either 16 Bit Dither or 24 Bit operation for O/P2.



Output Level Metering

An accurate 24 segment peak reading LED bar meter shows the incoming signal level from -50dBfs to 0dBfs plus separate overload LEDs for each channel.

QUICK SETUP PROCEDURE

- Plug in the left and right channel inputs on the rear of the unit, preferably using balanced wiring.
- On the front panel set the "**Input Level for 0dBfs**" **mode** switch to the correct setting - **calibrated** if in a studio and the entire system is calibrated, or **variable** in any other situation.
- Whilst paying close attention to the **Output Level Meter**, adjust the relevant input gain (The input controls are analogue and thus measured in dBU whilst the meter displays the digital output of the unit in dBfs, hence the +28 to 0 dBU controls). The levels should be set so that the meter is as close to 0dBfs as possible without drifting into overload, to obtain the optimum output levels.
- With your desired digital equipment connected to the any of the **O/P 1 digital outputs** (they work simultaneously), and also connected to the **wordclock outputs**, on the front panel set the top row (**O/P1**) of the **Output Sample Rate** to the desired rate, and set the **Bit Depth**.
- Where a digital backup of your audio is required, connect the equipment to the **O/P 2 digital outputs** on the rear panel, and set the bottom row (**O/P2**) of the **Output Sample Rate** to the desired rate, and set the **Bit Depth**.
- If you wish to set the wordclock using an external source, plug in the device to the **Wordclock Input** on the rear panel and set either or both **Output Sample Rates** to **EXT**. If the signal is strong the **Lock** led will light, if weak or unstable the Led will flicker or not light at all. In this case the external device and wiring should be checked.

A2D2 DMS-3 GENERAL INFORMATION

IF A FAULT DEVELOPS

For warranty service please call Drawmer Electronics Ltd. or their nearest authorised service facility, giving full details of the difficulty.

A list of all main dealers can be found on the Drawmer webpages.

On receipt of this information, service or shipping instructions will be forwarded to you.

No equipment should be returned under the warranty without prior consent from Drawmer or their authorised representative.

For service claims under the warranty agreement a service Returns Authorisation (RA) number will be issued.
Write this RA number in large letters in a prominent position on the shipping box. Enclose your name, address, telephone number, copy of the original sales invoice and a detailed description of the problem.

Authorised returns should be prepaid and must be insured.

All Drawmer products are packaged in specially designed containers for protection. If the unit is to be returned, the original container must be used. If this container is not available, then the equipment should be packaged in substantial shock-proof material, capable of withstanding the handling for the transit.

CONTACTING **DRAWMER**

Drawmer Electronics Ltd., will be pleased to answer all application questions to enhance your usage of this equipment. Please address correspondence to:

Drawmer (Technical Help line)
Coleman Street
Parkgate
Rotherham
S62 6EL
UK

Alternatively contact us by E-mail on :

tech@drawmer.com

Further information on all Drawmer dealers, Authorised service departments and other contact information can be obtained from our web pages on:

http://www.drawmer.com

SPECIFICATION

Analogue Inputs	Left/Right balanced XLR (Pin 2 Hot)
Frequency Response	20Hz-20kHz +/- 0.1dB
Input Level Range for 0dBFs	-2.0dBU to +28dBU
Crosstalk	-103dBFs @ 1kHz -84dBFs @ 10kHz
Factory Calibration of Presets	+18dBU = 0dBFs
THD+Noise	0dBFs >101 dBFs -1dBFs >103dBFs -3dBFs >105dBFs -6dBFs >107dBFs -12dBFs >110dBFs

A/D Converter
2 x Temperature Compensated Xtal Oscillators (TCXOs)

AES GRADE 1 Stability, Tolerance	+/-1ppm (0-60 Celcius), <<+/-1ppm (15-30 Celcius)
2 x Stereo Sample Rate Converters:	full up/down conversion 44.1, 48, 88.2, 96, 176.4, and 192kHz
2 x AES/EBU Neutrik XLR	Neutrik XLR
2 x S/PDIF Outputs	Coaxial, RCA Type
2 x TOSLink	JIS F05
Bit Depth	24Bit and 16Bit Dither

Word Clock Outputs

Output impedance	22.5 ohms giving 4v pk-pk into 75 ohms

General

Power Supply:	230Volt or 115V at 50-60hZ, 16VA
Fuse Rating	80mA for 230Volt, 160mA for 115Volt. CONFORMING TO: IEC127-2
Fuse Type	20mm x 5mm, Class 3 Slow - Blow 250Volt working
Dimensions:	1u, 19" Rack Mount, 482mm(W) x 44mm(H) x 145mm(D)
Weight	2.213 kg

BLOCK DIAGRAM