DRAWMER
D-Clock
DMS-2
WORD CLOCK MEASUREMENT
AND DISTRIBUTION AMPLIFIER

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**ONE YEAR LIMITED WARRANTY**

Drawmer Electronics Ltd., warrants the Drawmer DMS-2 D-Clock word-clock measurement and distribution amplifier 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 you can call Drawmer Electronics Ltd. directly 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.

**THIS WARRANTY IS IN LIEU OF ALL WARRANTIES, WHETHER ORAL OR WRITTEN, EXPRESSED, IMPLIED OR STATUTORY. DRAWMER MAKES NO OTHER WARRANTY EITHER EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. PURCHASER’S SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY SHALL BE REPAIR OR REPLACEMENT AS SPECIFIED HEREIN.**

In no event will Drawmer Electronics Ltd. be liable for any direct, indirect, special, incidental or consequential damages resulting from any defect in the product, including lost profits, damage to property, and, to the extent permitted by law, damage for personal injury, even if Drawmer has been advised of the possibility of such damages.

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.

In the interests of product development, Drawmer reserve the right to modify or improve specifications of this product at any time, without prior notice.
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 T315mA.

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

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 and 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.

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.
Digital audio facilities often require a number of clock sources, which are used to synchronise outboard processors to the system clock rate using external clock inputs. The Drawmer D-CLock is a dual input, twenty output word clock distributor with a 16 character blue LCD display providing a high accuracy reference measurement of the incoming sample rate. It uses a high stability TCXO (temperature compensated xtal oscillator) along with a microcontroller to measure the incoming sample rate to an accuracy of 2ppm and displays the information in three different formats, actual frequency (to one decimal place), nominal frequency +/- ppm error, or nominal frequency plus percentage of pull up or pull down.

It has both AES/EBU and BNC word clock inputs featuring a zero latency loopthrough output with switchable high impedance to maintain the correct level of the digital signal for onward distribution. Sixteen BNC clock outputs are situated on the rear panel with a further four BNC clock outputs on the front panel for quick patching to other digital devices.

The wordclock outputs can be fed from the wordclock input at any sample rate between 32KHz and 768KHz or derived from an AES11 input or stripped from an AES3 audio signal at any sample rate between 32KHz and 192KHz. Using an audio signal to provide the clock means even products without a wordclock output such as some analogue to digital converters, or one of the many mic pre’s with internal A/D conversion but no word clock output, can be the master wordclock source for the whole digital studio.

- 2 in/20 out Clock Measurement and Distribution Amplifier
- Inputs: BNC with zero latency loopthrough AES with with zero latency loopthrough
- Outputs: BNC loopthrough / AES loopthrough 20 BNC clock outputs - 33 Ohms impedance
- 3 sample rate measurement LCD modes accurate to 2ppm
- Universal voltage filtered mains power input
**FEATURES OVERLAY**

1. **4x Front Panel Outputs:** 4x BNC output connectors mounted on the front for ease of connectivity.

2. **Display:** Blue/White liquid crystal display with three switchable modes of operation.

3. **Display Mode:** Switch to control the mode of display 2.

4. **Input Source Select:** Selects either the AES or BNC rear panel input source.

5. **Clock Present LED’s:** Two led’s showing the Locked status of the AES and BNC inputs.

6. **1x BNC Clock Input:** Input is selected using.

7. **1x BNC Clock Through:** BNC output with zero latency loopthrough from BNC input.

8. **BNC Termination Sensitivity:** Switch to alter the BNC termination sensitivity between 75 Ohms and Hi Z. This must be switched to Hi Z when using Loop Through.

9. **AES Termination Sensitivity:** Switch to alter the AES termination sensitivity between 110 Ohms and Hi Z. This must be switched to Hi Z when using Loop Through.

10. **1x AES Input:** Input is selected using.

11. **1x AES Through:** AES output with zero latency loopthrough from AES input.

12. **16x BNC Clock Outputs:** Buffered BNC wordclock outputs with 33 Ohms impedance.

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**INSTALLATION**

The DMS-2 D-Clock is designed for standard 19” rack mounting and occupies 1U of rack space. Avoid mounting the unit directly above power amplifiers or power supplies 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'. Always connect the mains earth to the unit. Use fibre or plastic washers to prevent the front panel becoming marked by the mounting bolts.

**POWER CONNECTION**

The unit 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. The unit should always be connected to the mains supply earth using this cable.

Powered by a universal switch mode power supply, the DMS-2 D-Clock operates from mains voltages between 85 - 250v, eliminating the need to make any changes when touring and allowing the unit to remain fully operational during large fluctuations in the mains power supply.
AES11
Is 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.

Word Clock
Use only good quality 750 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!
CONTROL DESCRIPTION

DISPLAY
A Blue/White LCD display with three switchable modes of operation: FREQ, ±PPM and ±%.
The mode that is displayed during power down is saved for the next session.
The display accuracy is 2ppm at all sample rates up to 768kHz, or 0.1Hz increments at
48KHz sample rate

MODE
A switch controls the mode of display enabling you to read the incoming sample rate in your
preferred manner. Pressing the switch toggles through the three modes of FREQ, ±PPM and
±%, with led indication.

FREQ
Displays the actual frequency to four decimal places up to 768kHz.

±PPM
Displays the nominal sample rate with +/- ppm (part per million) error indication for 32, 44.1, 48, 96 & 192KHz

±%
Displays the nominal sample rate with percentage pull up/down indication for 32, 44.1, 48, 96 & 192KHz

INPUT SOURCE
Sets the input source to be used - either AES or BNC as connected on the rear panel - with led indication.

CLOCK PRESENT
The two LED’s indicate the status of the input sources. When a led is lit continuously a strong
signal is being received by that input source and the D-Clock is “locked on”. If a led flickers, the
signal for that particular input source is weak or unstable - in this case the source of this weak
signal should be located and improved.
CONNECTION SETUP FOR PRODUCTS WITH NO CLOCK OUTPUT

TYPICAL CONNECTION SETUP
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

CHAPTER 3

D-Clock DMS-2 GENERAL INFORMATION

INPUTS

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNC wordclock</td>
<td>Switchable 75ohm/hi z termination</td>
</tr>
<tr>
<td>AES sync</td>
<td>Switchable 110ohm/hz termination</td>
</tr>
</tbody>
</table>

SENSITIVITY

<table>
<thead>
<tr>
<th>Component</th>
<th>Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>AES sync</td>
<td>120mV</td>
</tr>
</tbody>
</table>

LOOPTHROUGH OUTPUTS

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNC Output</td>
<td>With zero latency loopthrough from input BNC</td>
</tr>
<tr>
<td>AES Output</td>
<td>With zero latency loopthrough from AES input</td>
</tr>
</tbody>
</table>

MAIN OUTPUTS

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNC wordclock outputs</td>
<td>20 x simultaneous re-buffered BNC wordclock outputs with 33 ohm output impedance. 4 of which are on the front panel for ease of connectivity.</td>
</tr>
</tbody>
</table>

DISPLAY

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue/white LCD</td>
<td>With three switchable modes of operation with mode led indicators for each:</td>
</tr>
<tr>
<td>frequency</td>
<td>Actual frequency up to &gt;768KHz</td>
</tr>
<tr>
<td>+/- ppm</td>
<td>Nominal sample rate with +/- ppm error indication for 32, 44.1, 48, 96 &amp; 192KHz</td>
</tr>
<tr>
<td>+/-%</td>
<td>Nominal sample rate with percent pull up/down indication for 32, 44.1, 48, 96 &amp; 192KHz</td>
</tr>
</tbody>
</table>

ACCURACY

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2ppm</td>
<td>At all sample rates up to 768KHz</td>
</tr>
<tr>
<td>0.1 Hz increments</td>
<td>@ 48KHz sample rate</td>
</tr>
</tbody>
</table>

INDICATORS

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AES/wordclock source select led indicators</td>
<td></td>
</tr>
<tr>
<td>AES/wordclock clock present led indicators</td>
<td></td>
</tr>
</tbody>
</table>

GENERAL

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply</td>
<td>Internal, Universal Input, 10 W</td>
</tr>
<tr>
<td>Power Requirement</td>
<td>&lt;6W</td>
</tr>
<tr>
<td>Fuse Rating</td>
<td>T315mA for All voltages. CONFORMING TO: IEC127-2</td>
</tr>
<tr>
<td>Fuse Type</td>
<td>20mm x 5mm, Class 3 Slow - Blow. 250Volt working</td>
</tr>
<tr>
<td>Dimensions</td>
<td>1u, 19&quot; Rack Mount, Depth 145 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>1.7 kg</td>
</tr>
</tbody>
</table>