

DRAWMER

M-Clock



DMS-1

MASTER CLOCK GENERATOR AND MULTIPLE SAMPLE RATE CONVERTER

CONTENTS

Warranty	2
Safety Consideration	3
Radio Frequencies Statement	3
<i>Chapter 1 - Introduction</i>	
Introduction	4
Installation	5
Installation and Connection Guide	5
<i>Chapter 2 - Control Description</i>	
Multiple Sample Rate Converter	6
Master Clock Generator	7
Fig.1 THD +Noise Diagram	8
<i>Chapter 3 - General Information</i>	
If a fault develops	10
Contacting Drawmer	10
<i>Chapter 4 - DMS-1 Data</i>	
Specification	11
Block Diagram	12



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ONE YEAR LIMITED WARRANTY

Drawmer Electronics Ltd., warrants the Drawmer DMS-1 M-Clock master clock generator and sample rate 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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In the interests of product development, Drawmer reserve the right to modify or improve specifications of this product at any time, without prior notice.

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MASTER CLOCK GENERATOR AND MULTIPLE SAMPLE RATE 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 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.



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 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.

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.

DRAWNER DMS-1 M-Clock

MASTER CLOCK GENERATOR AND MULTIPLE SAMPLE RATE CONVERTER

INTRODUCTION

In today's studio where increasing numbers of digital devices need to be interconnected, maintaining digital signal integrity can be a serious problem. The traditional professional solution has been to use an expensive master clock that drives all the digital equipment in the studio, but in most project studios there are often pieces of equipment that don't have wordclock inputs such as consumer CD players, MD recorders, DAT machines and budget computer soundcards.

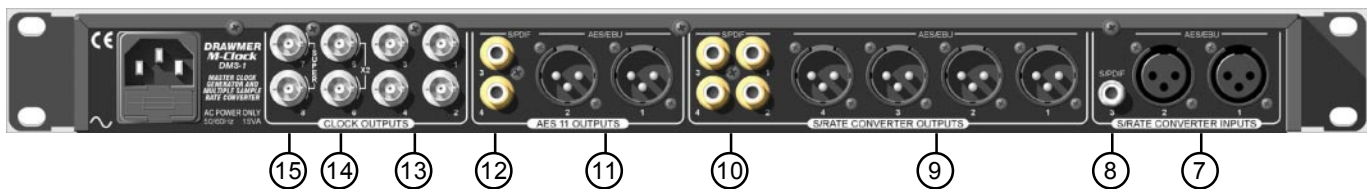


The Drawner M-Clock DMS-1 has been designed to be the heart of synchronisation in the digital audio studio, offering an extremely highly specified, multiple output master clock generator that also incorporates four further channels of sample-rate-conversion (a total output of twenty four Grade 1 synchronization signals in the form of AES/EBU, SPDIF, optical Toslink and AES 11), all locked to the same master clock. The M-Clock generates seven Ultra Low Jitter sample rates - 44.1k, 48k, 88.2k, 96k, 176.4k and 192k as well as 256x Superclock, all stable to < 1ppm. If any equipment in the studio suffers jitter at its output the sample rate converters may be used to de-jitter and re-clock the signals before further transmission.

The advantages of combining wordclock with multiple channels of 'clock-locked' sample rate conversion are significant and often under-appreciated. With M-Clock, all your 'pro' and consumer digital equipment can run in the same system, locked to the same clock, with no worries about finding a suitable sync source. You'll no longer have to switch equipment between internal and external sync as you repatch - and the M-Clock helps to maintain optimum stereo imaging, lower noise and lower distortion. If you have multiple pieces of digital equipment in your studio, whether professional or a mixture of professional and consumer, the Drawner M-Clock is the most effective upgrade you can make.



- | | | |
|--|---|---|
| <p>① Front Panel Input:
either 1x S/PDIF or 1x optical TOSLINK</p> | <p>② 4x Status Locked Leds:
indicates a locked signal for each of the four inputs</p> | <p>③ 4x Toslink Outputs:
conveniently located on the front panel for easy access.</p> |
| <p>④ Output Sample Rate:
the two switches set a sample rate of 44.1k, 48k, 88.2k and 96k.</p> | <p>⑤ Output 5/6 sample rate x2:
doubles the sample rate as set by ④ - upto 192k - for clock outputs 5 and 6.</p> | <p>⑥ Superclock (256x) Output:
provides Superclock to clock outputs 7 and 8.</p> |



- | | | |
|---|--|---|
| <p>⑦ 2x AES/EBU Inputs:</p> | <p>⑧ 1x S/PDIF Input:</p> | <p>⑨ 4x AES/EBU Outputs:</p> |
| <p>⑩ 4x SPDIF Outputs:</p> | <p>⑪ 2x AES 11 XLR Outputs:
outputs to the AES 11 standard
(Also called DARS, Blank Frame).</p> | <p>⑫ 2x AES 11 SPDIF Outputs:
outputs to the AES 11 standard.
(Also called DARS, Blank Frame).</p> |
| <p>⑬ 8x BNC Clock Outputs:
the sample rate of 44.1k, 48k, 88.2k and 96k is set by switches ④ .</p> | <p>⑭ 5/6 x2 Clock Outputs:
when switch 5 is set to double the output is twice the sample rate as set by switches ④ , upto 192k.</p> | <p>⑮ 7/8 Superclock (256x) Output:
when switch 6 is in, connectors 7/8 provide Superclock (256x) output.</p> |

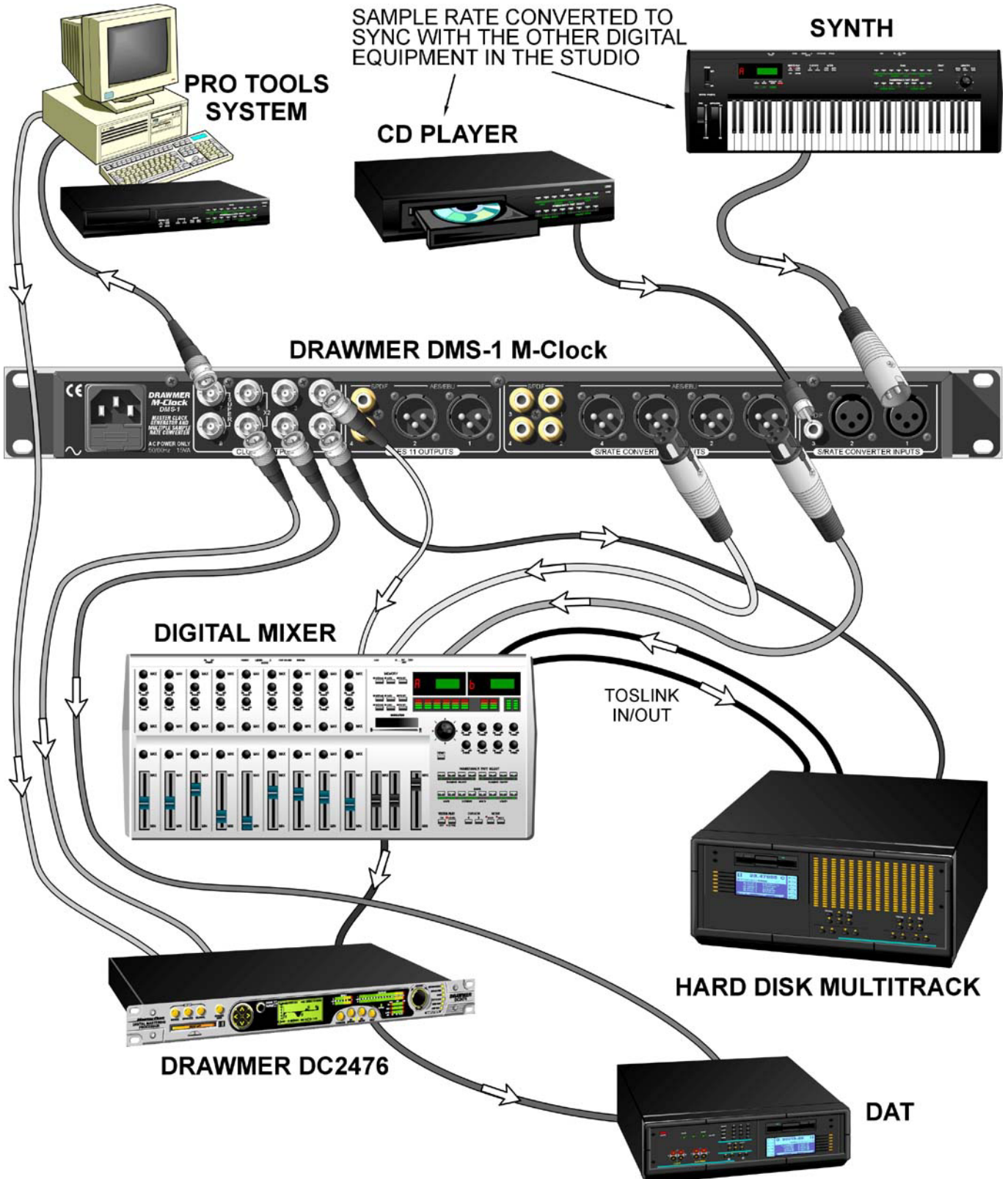
INSTALLATION

The DMS-1 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.

INSTALLATION AND CONNECTION GUIDE

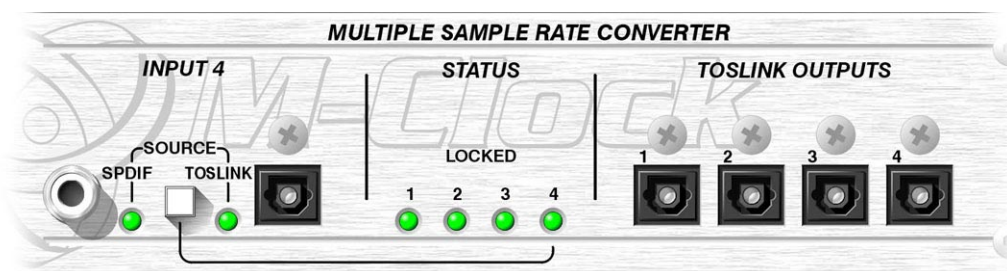


CONTROL DESCRIPTION

MULTIPLE SAMPLE RATE CONVERTER

Certain equipment in the studio may not have word clock inputs which has in the past caused synchronisation problems, using the four channels of high quality sample rate conversion on the DMS1 M-CLOCK these digital audio sources may be synched to the same ultra low jitter AES3 grade 1 stability master clock generator as the equipment using the word clock or AES11 outputs from the DMS-1.

Also if any equipment in the studio suffers jitter at its output these sample rate converters may be used to de-jitter and re-clock the signals before further transmission. Each sample rate converter input is fed simultaneously to AES/EBU, SPDIF and TOSLINK outputs solving any connectivity problems and allowing signal distribution. *see fig.1*



INPUT 4

As well as the three inputs on the rear of the unit (2xAes/Ebu 1xSPDIF) two further sockets are located on the front. These provide convenient access for the user to input from alternative sources, and are selected between **SPDIF** and **TOSLINK** using the switch.

STATUS 1,2,3,4

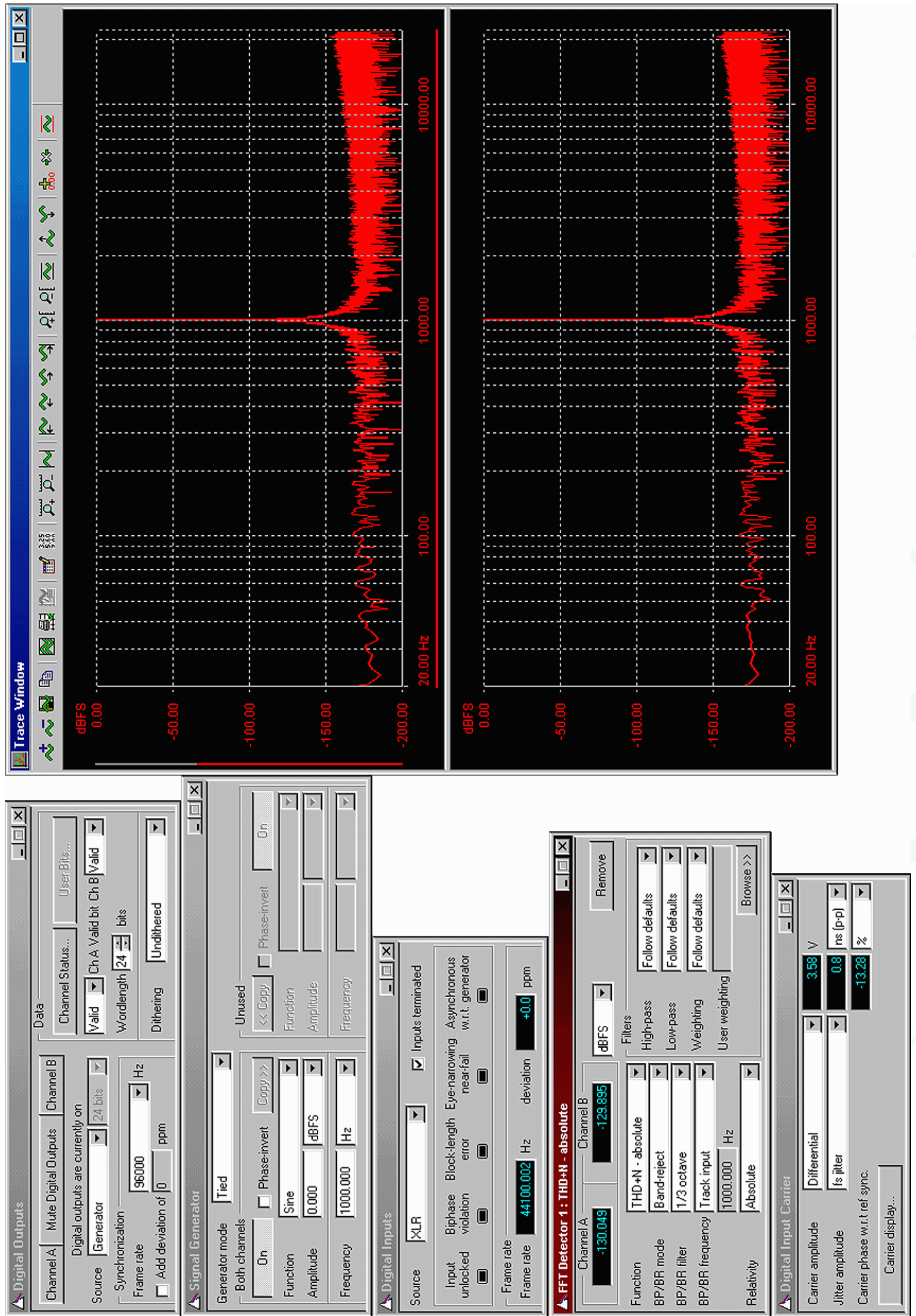
The four LED's indicate the status of the input sources, and correspond with the numbered input connectors, 1 to 3 on the rear, and input 4 on the front. When a led is lit continuously a strong signal is being recieved by that input source and the M-Clock is "locked on". If a led flickers, the signal for that particular input source is weak or unstable - in this case the source of this weak signal should be located and improved.

TOSLINK OUTPUTS 1,2,3,4

As well as the numerous outputs on the rear of the unit, four further **TOSLINK** sockets are located on the front, providing convenient access for the user. The numbers 1 to 4 correspond with the relevant input source i.e. Input source 3 (SPDIF on the rear) has the TOSLINK output 3 etc.

See Fig 1. The Noise Floor of the Sample Rate Converters

Fig. 1 THD +Noise for Sample Rate Converter

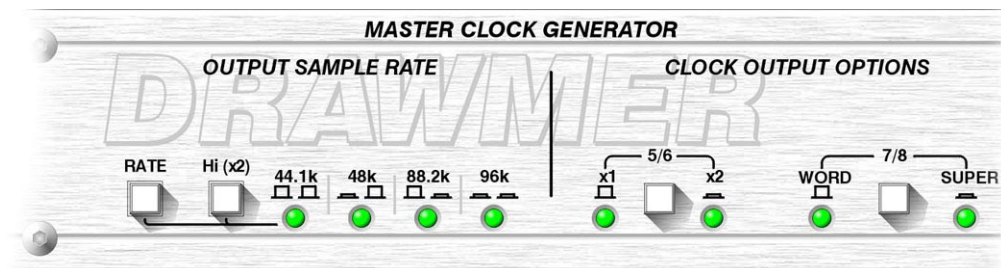


MASTER CLOCK GENERATOR

The Drawmer M-Clock supplies word clock, S/PDIF, AES 11 grade 1, as well as Digidesign's superclock (256x) allowing you to synchronize Digidesign Pro Tools™, and a host of other digital audio equipment through one stable and very accurate unit.

The M-clock provides a wide range of sample rates from 44.1k upto 192k, as well as Superclock, all set using the front

panel switching. In addition upto three different sample rates can be output at the rear of the unit, simultaneously, i.e. 96k output from Word Clock outputs 1 to 4, 192k output from 5 and 6, and 256x superclock from 7 and 8. This feature allows, for example, a DVD quality backup to be made whilst working on Pro Tools™ simultaneously, making studio synchronization easier than ever before.



OUTPUT SAMPLE RATE

The sample rate of the the unit is set using a combination of two switches, with the resulting sample rate indicated by the corresponding led's. The **RATE** switch sets the base rate - either 44.1k, when the switch is out, or 48k, when in. The **Hi (x2)** switch doubles the sample rate that is set by the **RATE** switch. i.e **RATE** is set to 48k (pressed in), **Hi (x2)** is pressed in - the resulting output sample rate is 96k.

The following output sample rates can be achieved:

RATE switch position	Hi (x2) switch position	Result
Out <input type="checkbox"/>	Out <input type="checkbox"/>	44.1 kHz
In <input checked="" type="checkbox"/>	Out <input type="checkbox"/>	48 kHz
Out <input type="checkbox"/>	In <input checked="" type="checkbox"/>	88.2 kHz
In <input checked="" type="checkbox"/>	In <input checked="" type="checkbox"/>	96 kHz

CLOCK OUTPUT OPTIONS

5/6


The **5/6** switch affects only connectors 5 and 6 on the BNC Clock Outputs on the rear of the panel, working independantly from the other outputs, and can provide a maximum output sample rate of **192k**.

When pressed in the sample rate that is set by the **RATE** and **Hi (x2)** switches is doubled i.e. Rate/Hi (x2) set the sample rate to 48k (Rate in/Hi out) - with 5/6 switch pressed in the sample rate at the BNC output 5 and 6 is doubled to 96k even though the other outputs on the M-Clock are still 48k. This would allow the user to have a workstation working at 48k whilst simultaneously recording a DVD quality backup.

Output Sample Rate	5/6 Switched IN (x2) <input checked="" type="checkbox"/>
44.1 kHz	88.2 kHz
48 kHz	96 kHz
88.2 kHz	176.4 kHz
96 kHz	192 kHz

7/8

When the **7/8** switch is active the M-Clock can output at the Superclock standard, as used by Pro Tools™. The **7/8** switch affects only connectors 7 and 8 on the BNC Clock Outputs on the rear of the panel, working independantly from the other outputs.

Output Sample Rate	7/8 Switched IN (Superclock) 
44.1 kHz	11.2896 mHz
48 kHz	12.288 mHz
88.2 kHz	11.2896 mHz
96 kHz	12.288 mHz

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>

M-Clock DMS-1 DATA SPECIFICATION

Internal Clock Generator

2 x Temperature Compensated Xtal Oscillators (TCXOs)

AES11 GRADE 1 Stability, Tolerance

+/-1ppm (0-60 Celcius), <<+/-1ppm (15-30 Celcius)

Phase noise

-130 dBc/Hz @ 1kHz

@ 24.5760 MHz to give Fs

48 kHz, 96 kHz & 192 kHz + 256Fs (superclock)

@ 22.5792 MHz to give Fs

44.1 kHz, 88.2 kHz & 176.4 kHz + 256Fs (superclock)

Word Clock Outputs

Output impedance

22.5 ohms giving 4v pk-pk into 75 ohms

Outputs 1-4 selectable between 44.1, 48, 88.2, 96 kHz

Outputs 5-6 selectable between 44.1, 48, 88.2, 96, 176.4, 192 kHz

Outputs 7-8 selectable between 44.1, 48, 88.2, 96, 256Fs (Superclock)

AES 11 Outputs

2 x Neutrik XLR

110 ohm source @ 44.1, 48, 88.2, 96 kHz

2 x Gold Plated Phono

75 ohm source @ 44.1, 48, 88.2, 96 kHz

Sample Rate Conversion

4 x Stereo Sample Rate Converters:

full up/down conversion from 44.1kHz to 96kHz

2 x Neutrik XLR AES/EBU inputs

1 x Phono SPDIF input

1 x Switchable Phono/TOSLINK input (Front Panel)

All outputs simultaneous on

4 x AES/EBU XLR, 4 x SPDIF Phono, 4 x TOSLINK

THD+Noise

> 120 dBFs

General

Power Supply:

Internal, Universal Input, 10 W

Fuse Rating

T315mA for All voltages. 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

1.7 kg

BLOCK DIAGRAM

