

D62
OPERATORS MANUAL

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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:

- < Reorient 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.

Unauthorized 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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DRAWMER D62

Digital Module

SAFETY CONSIDERATIONS



CAUTION - STATIC HANDLING

TO REDUCE THE RISK OF DAMAGE TO THE DIGITAL MODULE ENSURE THAT STATIC HANDLING PROCEDURES ARE OBSERVED WHEN HOLDING THE D62-TDIF MODULE.

CAUTION - SERVICING

DO NOT PERFORM ANY SERVICING IF YOU ARE NOT QUALIFIED.

WARNING

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

INTRODUCTION

The D62-T or D62-A digital convertor module may be retrofitted to an analogue 1962 unit. This provides 16, 18, 20 or 24-bit wordlength outputs in both AES/EBU and S/PDIF formats with user selectable dither. The D62-T also includes a Tascam™ T-DIF interface while the D62-A has an integral ADAT™ optical interface. Word sync In and Out is provided as standard and the user may select between 48kHz, 44.1kHz and externally clocked sample rates. *This manual will refer to the digital module as the D62 wherever it is applicable to both T-DIF and ADAT.*

INSTALLATION

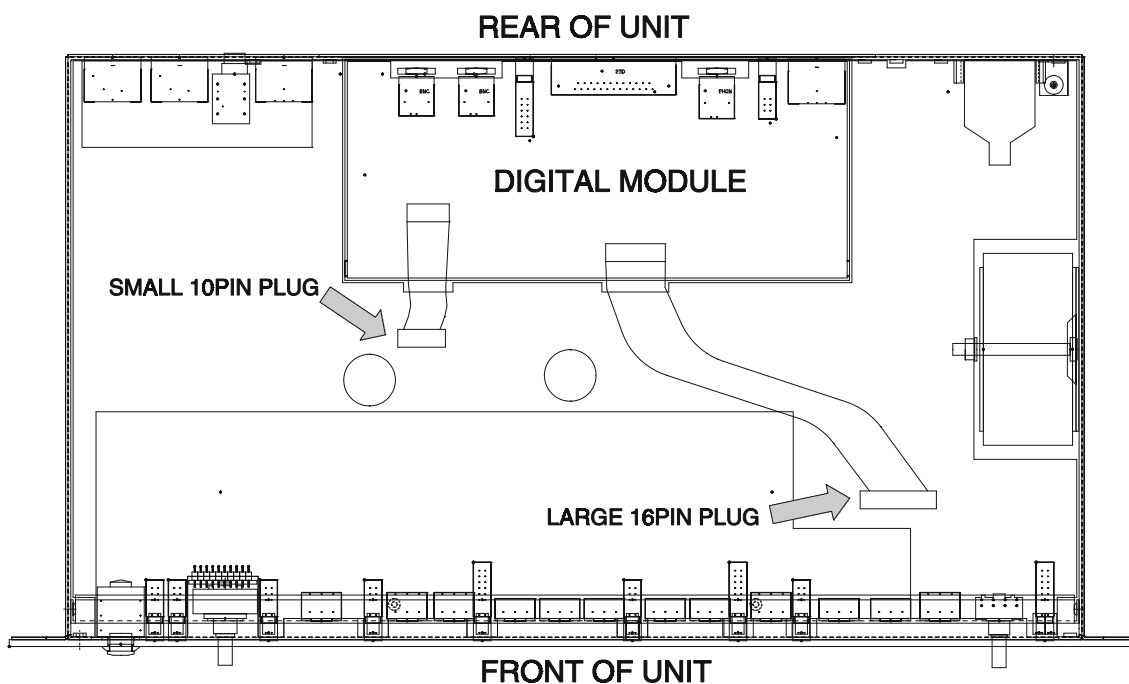
The D62 Digital modules are **only** designed for operation within a Drawmer 1962 analogue unit. **Under no circumstances should the units be installed into any other manufacturers' or custom device.** Installation into the existing 1962 analogue unit is very simple, however if you have any doubts or problems, please refer to your local Drawmer dealer or a competent qualified electronic engineer.



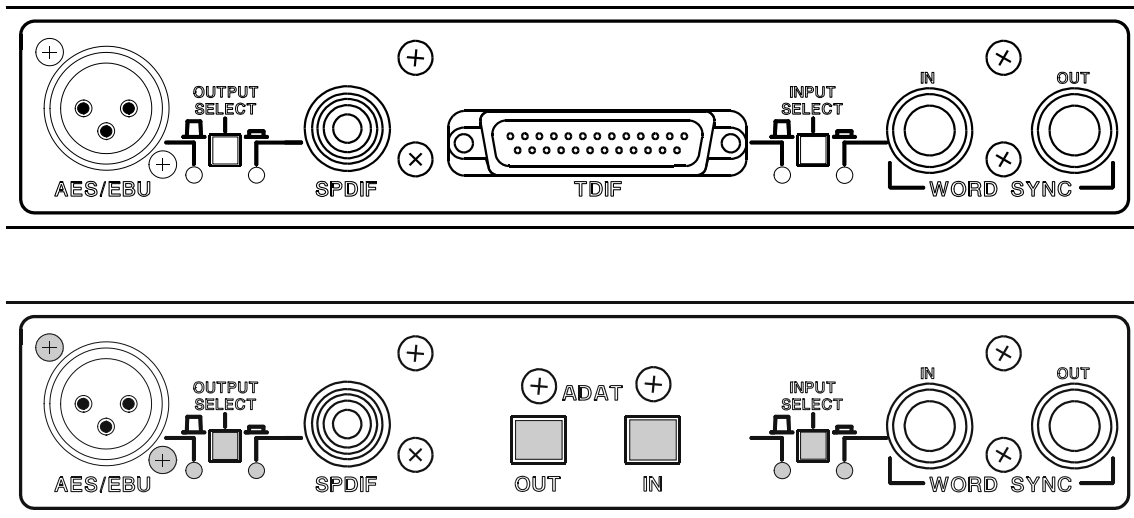
Correct handling with consideration for static discharge will prevent damage to the sensitive circuitry of the digital module. It is often the case that static discharge does not fully destroy IC circuitry; it is more likely that the IC circuits are taken to within 90% of their lifetime expectancy. Failure to observe correct procedures could void any product warranty.

To perform this installation:

- < **Disconnect the mains power cable from the unit.**
- < With a number 1 pozidrive screwdriver, remove the 8 screws that retain the top cover. (ie: two on each side; two at the rear and two counter-sunk screws along the top at the front edge).
- < Remove the blanking panel from the rear of the unit.
- < Observing static handling procedures, slide the digital module into the 1962 unit from the rear. Use the 4 pozi-pan screws to secure the digital module firmly into place.
- < The two flying plugs cannot be confused with each other as they are of grossly different lengths and different sizes. See the drawing below to confirm the correct socket for each cable plug. Additionally, each plug is polarised to prevent damage by insertion of the plugs if wrongly inverted.



DIGITAL CONNECTIONS



DIGITAL CLOCK SYNCHRONISATION

When clocking the D62 from an external, master clock source, there are two possible methods of termination. When using the TEAC® TDIF-1 Digital Interface protocol, which uses a 25 pin D-sub connector system, or ADAT® optical system, the Input Select button should be in the Out position. Alternatively, external synchronisation may be achieved via the 75Ω BNC connector, in which case the Input Select button should be set to its IN position. The operation of the D62-A version is identical, except that the multitrack interface is ADAT. When the unit is suitably connected, observe the Input Select LED status to confirm the following clock conditions:

Z The LED will illuminate **brilliantly** and steadily if a reliable and compatible clock source is recognised.

The LED will **blink** when External Clock is selected on the front panel, but no external clock is detected.

' The LED will flicker **dimly** if the clock signal is inadequate due to problems such as level matching or signal corruption. Typical causes of such problems are: the connected cable is too long or of an incorrect type; the external clock signal has deteriorated in quality to a point where it cannot be read reliably.

When External Clock is selected on the front panel, a reconstituted version of the input word clock is available at the Word Sync Output BNC connector.

DIGITAL DATA

Three digital data output formats are supported by the D62 digital interface.

AES/EBU: 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 AES/EBU output is enabled when the Output Select button is in its Out position. The status LED illuminates to confirm this mode has been selected.

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: via a high quality RCA type phono jack where the data conforms to the Sony™ Phillips™ 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. This socket is enabled when the Output Select button is set to its **IN** position; the status LED illuminates to confirm selection of this mode.

TDIF: (Where the D62-T is fitted). This is permanently enabled and presents the digital data in the standard paired formats. If connection is to a Tascam™ DA88 or DA38, we strongly recommend using the Tascam accessory Dubbing cable PW-88D which is 1metre in length. We have also successfully used the 5 metres cable PW-88DL, but external interference might make digital data or timing signals unreliable.

ADAT: (Where the D62-A is fitted). This is permanently enabled and presents the digital data to the standard Alesis™ format, where the stereo signal is available on all eight tracks for the operator to choose which tracks to record. If connection is to a Alesis™ ADAT it is suggested that professionally terminated optical cables are used.

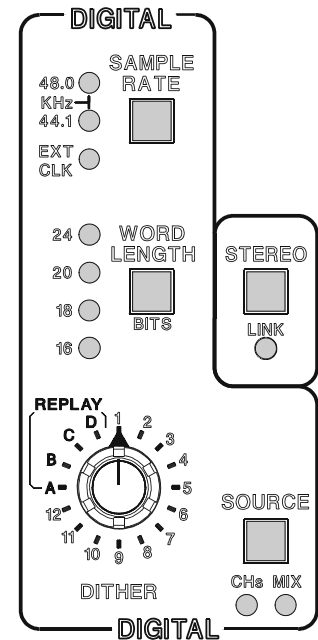
For additional information, refer to the documentation accompanying the TDIF or ADAT compatible recording or storage device to which this socket is to be connected.

CONTROL DESCRIPTION

The D62 module is a very high resolution analogue to digital converter utilising proprietary Drawmer technology. It has a selection of sophisticated dither options. There is a proprietary system enabling up to 23-bit wordlength recordings to be made across three tracks of a digital multitrack where the multitrack machine is less than 24-bit resolution. In the case of the D62-T, recording is possible on a Tascam™ DA88, DA38 or TDIF-1 compatible machine, whereas the D62-A card provides an optical interface for Alesis ADAT™ and compatible machines.

Various software options are available to incorporate 16, 20 or 24-bit machines.

If any WORD LENGTH yellow LED is flashing, an unrecoverable power 'brownout' (voltage dip or glitch) has caused the DSP to mute its digital outputs. Switch the power Off and On again to restore normal operation.



REAR PANEL CONTROLS:

There are two push-button switches on the D62-T rear connector panel. These should only need setting during installation as they define input and out cable preferences. *For additional information, see the D62 Installation section on page 3.*

Input Select:



If an external word clock is available, this push button selects its source. Either the BNC connector, the TDIF-1 or ADAT digital input can be the 1962 master clock. The front panel Sample Rate option EXT CLK activates this clock source.



The External WORD SYNC and TDIF (ADAT) clock inputs are filtered through a low-noise PLL (Phase Locked Loop) in the D62, the clock frequency (sample rate) should be within the range 29KHz to 51KHz. If the PLL cannot lock to the incoming clock reliably, the EXT CLK front panel LED will flash indicating that audible glitches and distortion will be introduced. *See page 3.*

Output Select:



Selects AES/EBU via the XLR socket, or, S/PDIF via the RCA Phono socket with appropriate data output formats. This switch setting does not affect the T-DIF or ADAT output.

1962 FRONT PANEL DIGITAL CONTROLS:

Sample Rate:



This switch selects 48.0KHz, 44.1KHz and EXTERNAL clock for synchronising to other digital devices. Any external clock input is 'cleaned' by the D62 PLL and output at the rear panel BNC connector marked WORD SYNC Out.



Reduce monitor volume levels before casually selecting 'EXT CLK', selecting it without any external clock connected results in a nasty 0dBfs digital noise being output!

Word Length:



Selects the word length (bit resolution) of the audio samples to be 24, 20, 18 or 16 bits. Match this to your digital recording, storage or processing device. Selecting '16' sends 4 x stereo pairs of tracks to the TDIF or ADAT output, while 24, 20 and 18 sends high resolution tracks to the TDIF or ADAT for recording on tracks 1,2,3 or 5,6,7.

Source:



Select 'Chs' for the most direct audio path (thus: highest performance) to the D62 analogue-to-digital convertor, or 'MIX' which inserts the CHAN PAN controls to the path. MIX also enables up to 3 additional analogue inputs (eg. stereo outputs from other 1962 units) to be mixed via the rear panel Stereo Mix inputs to the master D62 digital output. Pre- or post-output level control is selectable on two internal jumper links. See *configuration jumpers section on page 9*.

In all configurations the audio signal to the D62 passes through a 'Soft clip' circuit, therefore short transient audio peaks will not cause noticeable distortion on the digital outputs.

Dither:



1 - 12:

This affects the type of dither added to the audio signal when recording with WORD LENGTH less than 24 bits. Position 1 is generally the best compromise and places all of the dither noise at the high end of the audio spectrum, where the ear is least sensitive. In the majority of situations, this will produce excellent results. The other 10 positions progressively reduce the level of the dither, spreading it further down the audio spectrum. Position 11 is standard 'White noise' dither and position 12 is dither OFF. See *following DITHER SELECTOR OPTIONS on page 8*.



Care must be taken when applying heavy (more than +30dB) post EQ HF boost to noise shaped dithered recordings as excessive HF levels can be generated, possibly causing damage to speaker tweeters.

Noise shaped dither is effective when a WORD LENGTH is selected of less than 24 bits. It effectively decreases distortion and noise on low level signals when compared with unshaped dithering; an apparent digital noise floor reduction of 12 to 18dB should be perceived.



REPLAY A, B, C, D:

The four positions A, B, C and D (in yellow) are used for playback from a digital multitrack recorder to the AES/EBU and SPDIF outputs, 16bit or High resolution mode will be automatically selected.

Which specific tracks are replayed are detailed at the bottom of the table on the following page.



If high resolution tracks are replayed with any of the tracks missing audible distortion will be heard.

RECORDING NOTES

The multitrack tape must be pre-formatted at the required sample rate with Emphasis Off before recording from the D62.

When recording to a multitrack machine, the SAMPLE RATE should be set to EXT CLK and the rear panel INPUT SELECT set to TDIF/ADAT as the multitrack tape machine must supply the master clock.

Note: On the DA88/DA38 the 'Fs' LED will flash, it does not affect the recording.

High resolution recording:

When the required resolution is greater than that of the multitrack machine, the 1962 splits the 2 digital signals into 3 channels, where the 3rd channel is used to store the remainder bits. For example, when using a 16bit multitrack machine to record a stereo 24bit signal, tracks 1,2, and 3 (or 5,6 and 7) must be selected. The third channel sounds like white noise and is used to reconstruct the 24bit signal on playback. With the availability of 20bit and 24bit machines, there is no need to split signals below the word length of the machine, so 3 software versions are available to ensure full compatibility.

16bit version.

When 'WORD LENGTH' is set to 16 bit, signals are recorded to multitrack without splitting, so all 8 tracks are available.

If 'WORD LENGTH' is set to 18, 20 or 24bit signals are split into 3 tracks (1+2+3 or 5+6+7).

20bit version.

When 'WORD LENGTH' is set to 16, 18 or 20 bit, signals are recorded to multitrack without splitting, so all 8 tracks are available.

If 'WORD LENGTH' is set to 24bit, signals are split into 3 tracks (1+2+3 or 5+6+7).

24bit version.

With this version, there is no need to split the signals, so whichever resolution is selected, signals are recorded directly, leaving all 8 tracks available for use.



It is important to remember that for any high resolution recording to be successful, the (tape) operator must enable recording on ALL of the tracks of the chosen output group (1+2+3 or 5+6+7).

DITHER SELECTOR OPTIONS

Position	Dither and Noise Shaping
1	Positions the noise shaped dither to the very top of the audio spectrum at a level of +30dB above the quantise noise floor. The ears are very insensitive at this frequency, hence the noise is inaudible, resulting in subjectively clean signals with wide dynamic range. Adding extreme HF EQ boost at a later stage is NOT recommended.
2	The same frequency as 1 (above) with only +20dB of boost. The reduction in level slightly increases distortion, but the tolerance to HF EQ on replay is increased.
3	Shaped dither above 17KHz @ +30dB.
4	Shaped dither above 17KHz @ +20dB.
5	Dual slope filtered dither above 16KHz @ +10dB. A particularly effective setting combining subjective neutrality with a worthwhile increase in dynamic range and high tolerance to post HF EQ.
6	Shaped dither above 14KHz @ +20dB.
7	Shaped dither above 14KHz @ +15dB.
8	Shaped dither above 12KHz @ +15dB.
9	Smooth, dual-slope filtered dither above 10KHz @ +10dB. A relatively gentle noise shaping with a worthwhile increase in dynamic range and a neutral sound.
10	Shaped dither above 10KHz @ +10dB.
11	White noise dither. No noise shaping.
12	Dither / Noise shaping OFF. Caution as a truncated word length will give distortion.
A	Tape Playback of Tracks 1,2 & 3 in high resolution modes; Tracks 1,2 in 16-bit mode.
B	Tape Playback of Tracks 1,2 & 3 in high resolution modes; Tracks 3,4 in 16-bit mode.
C	Tape Playback of Tracks 5,6 & 7 in high resolution modes; Tracks 5,6 in 16-bit mode.
D	Tape Playback of Tracks 5,6 & 7 in high resolution modes; Tracks 7,8 in 16-bit mode.

CONFIGURATION

Configuration Jumpers:

A simple adjustment of two internal PCB jumpers (one for each channel) enables the front panel Channel Output Level setting to be passed onto the Channel Pan control in the Stereo Mix section and therefore onwards to the Digital Section. The **normal and recommended** factory setting for both jumpers is for Stereo Mix Channel Pan to be **pre** Channel Output Level control.



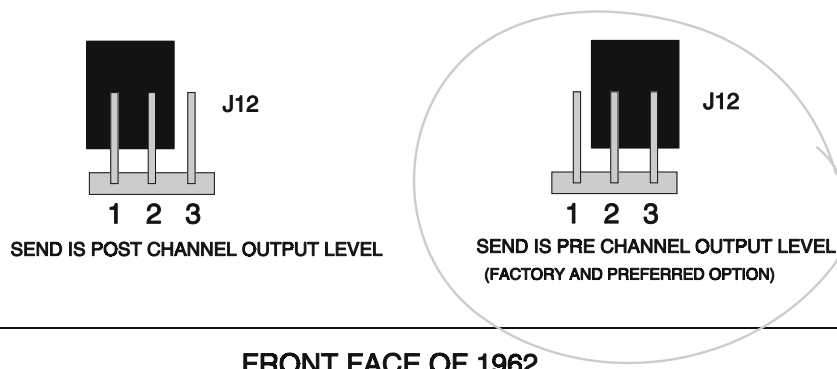
It is less desirable option for the Mix section and the Digital Source Chs (channels) feed to be made post-level control for several reasons:

- 1) Digital output noise will be increased by 4dB.
- 2) There is a greater chance of a digital overload, undoing the control and safety feature of the limiter.
- 3) Any digital output level will be un-calibrated, unless the channel output level control is set to the +20dB position.

To perform this change:

- 1: **Disconnect the mains power cable from the unit.**
- 2: With a number 1 pozidrive screwdriver, remove the 8 screws that retain the top cover. (ie: two on each side; two at the rear and two counter-sunk screws along the top at the front edge).
- 3: Locate the jumper blocks referenced as **J12**.
For channel 1 (left) this is the upper PCB. The jumper is centrally positioned along the rear edge of the PCB.
For channel 2 (right) this is the lower PCB. Its jumper is central to the unit, near the small IDC connector for the digital unit.
- 4: Lift off the shorting jumper block and replace on the centre pin and previously free pin. **In most cases, the jumpers have been replaced by soldering the pins together.**
- 5: Replace the top cover ensuring the correct screws are used.

MIX & DIGITAL SOURCE CHs CONFIGURATION JUMPERS



IF A FAULT DEVELOPS

For warranty service please call Drawmer Electronics Ltd. Or their nearest authorised service facility, giving full details of the difficulty. 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 given. 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 the best adequate protection. If the unit has to be returned the original container must be used. If this container is not available, then the equipment must 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 all correspondence to:

Drawmer (Technical Helpline) : Coleman St.: Parkgate : Rotherham : S62 6EL : UK

or, Email us on : tech@drawmer.com

Drawmer dealers, Authorised service departments and other contact information can be obtained from our web pages on <http://www.drawmer.com>

TECHNICAL SPECIFICATIONS

(All measurements taken at 0dBu operating level)

Specification with LINE input @ 0dBu, (all effects disabled):

CROSSTALK	- 105dB	(@ +0dB gain)
THD+n @ 1Khz -2dB (soft clip)	- 70dB	(@ +0dB gain)
THD+n @ 1Khz -20dB	- 93dB	(@ +0dB gain)
THD+n @ 1Khz -60dB	-120dB	(@ +0dB gain)
NOISE FLOOR	-123dB	(@ +0dB gain)

POWER REQUIREMENTS	Requires 1962 analogue unit for power.
WEIGHT (incl packaging)	0.5. Kgs

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