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DC - 2

Dual Channel Mono / Stereo Compressor

Toft Audio Designs

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INSTRUCTION BOOK CONTENTS

ABOUT THE DESIGNER

Malcolm Toft started his career in the late 60's as a recording engineer and was the first engineer to be employed at the famous Trident Recording Studios in London. Among his credits are the recordings of David Bowie's 'Space Oddity' album, James Taylor's first album, and three albums with T-Rex. He was also the mixing engineer on the Beatles 'Hey Jude' single.

In 1972 Trident studios decided to buy a new recording console and Malcolm was able to convince the owners that they could in fact build one themselves. From this idea was borne Trident Audio Developments Ltd. that went on to become a leading manufacturer of music recording consoles. One of the company's earliest advertising slogans was 'designed by recording engineers for recording engineers'. This became a key component of what made the 'Trident Sound' so unique. Coming from a background of being a recording engineer rather than an electronics engineer, Malcolm has always designed with his ears rather than a text book and it is this coupled with over thirty years experience that has enabled him to develop his own 'philosophy of sound' that is his trademark.

Consoles designed by Malcolm have been used to record just about every major artist in the past three decades, including Elton John, Dire Straits, David Bowie, Rod Stewart and Stevie Wonder to name but a few. More recently they have been used to record artists such as Radiohead and Pavarotti. The Toft Audio range therefore brings with it an historic pedigree, but what excites Malcolm tremendously is the fact that he is able to offer his designs at a price that is now affordable to the smaller studios and home recordists.

PRODUCT DESCRIPTION

The DC-2 provides two channels of instrument/line amplifiers and F.E.T. compressors. Each compressor can be used independently or linked for stereo operation. The unit will take the signal from a line level source or instrument and process it so that it is ready to feed straight into a recording device such as a computer controlled digital audio workstation or analog storage device such as a multi-track tape recorder. Each section can also be inserted into the path of a mixer channel to provide individual channel compression, or as a linked pair, the two channels can be placed across the stereo mix.

Each of the two sections offer a wide range of control coupled with extremely high quality analog electronics that have a real pedigree. The line/instrument amplifier is the same design as used in Malcolm Toft's top range of recording consoles, while the compressor section borrows heavily from vintage Trident designs. It can operate as two separate channels, or by using the compressor 'couple' control can be linked so that the stereo image does not shift when compression is taking place (more about this in the compressor section). Because of this feature, it is also possible to connect the DC-2 across the final mix to add the finishing touches as a mastering tool.

The DC-2 can be used to provide a pristine signal path of exceptional quality when required allowing subtle control of the audio path, or it can be used to add extra punch and dynamics to an otherwise lackluster signal.

CONNECTING THE UNIT

The rear panel of the unit provides both x-l-r and 1/4" jack inputs for the line input and output of each channel. These connectors use the standard industry convention of pin 1 ground, pin 2 + and pin 3- for x-l-r connectors and tip +, ring -, and sleeve ground for jacks. The jacks can also be connected unbalanced, tip + and sleeve ground. When making an input connection, the input level control for each channel should be at minimum. The front panel instrument jack is unbalanced and follows the same wiring code. The line input is designed to accept balanced or unbalanced, line level audio signals and is selected via the front panel 'Instr./Line' switch.

The outputs from each channel are low impedance and designed to operate with long cable runs without signal degradation such as loss of high frequencies. The front panel instrument input is high impedance designed to work with a wide range of musical instruments such as guitars, basses and electronic keyboards.

A standard I.E.C. mains inlet is provided for A.C mains power and universal voltages of either 110 or 240 volts are selectable by rotating the fuse holder incorporated in the mains inlet socket.

INPUT SECTION

The input section of the DC-2 consists of a very high quality line amplifier designed specifically for professional audio applications. It exhibits near theoretical minimum noise figures, has an extremely fast transient response and will handle a wide range of input levels with a frequency response that extends above 40kHz. The input level can be adjusted continuously over a wide range and the input control is conveniently calibrated so that in its center position, the gain is zero.

When connecting a line level signal to the input of the unit, the 'Instr./Line' selector switch should be selected to 'Line' and the 'Instr./Line Gain' control sets to it's midway position ('0'). The 'Comp' switch should be set to 'OUT' (led extinguished). The V.U meter can be used to monitor the output level of the unit after having first selected it's appropriate 'Meter' switch (situated to the left of the meter) to the 'O/P' position. The 'Input' control should be set so that signal peaks go just into the red portion of the meter scale and should never cause the meter to deflect fully right for sustained periods. This will provide a suitable operating level for the unit and will match other professional audio equipment. The DC-2 is in fact capable of very high output levels (up to +26dBm) but by setting the level as described above, adequate overload margins are maintained and there should be no danger of overloading following equipment.

When using an instrument input, the 'Instr./Line' switch should be selected to 'Instr.' and the 'Input' control set to its fully anti-clockwise position. The 'Input' gain control should be advanced clockwise and in the same way as described above, the VU meter can be used to set an appropriate level through the unit.

F.E.T. COMPRESSOR

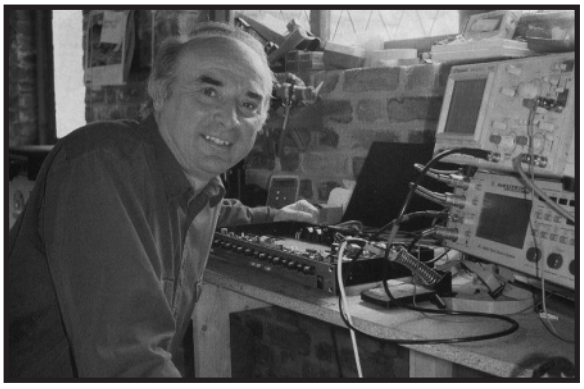
There are many ways to control or reduce the dynamic range of signal and these include photo-optical devices where the signal triggers a light emitting device such as an led which in turn shines on to a photo electric cell. The cell then varies in resistance according to the light shining upon it and the more light, the lower the resistance gets. This can then be used to reduce the signal level and therefore control the dynamic range. Compressors based on these devices were particularly popular in the sixties and are known for their characteristic 'soft' form of compression. This is also true of tube based compressors which usually operate on a 'variable mu' principle to control the dynamic range. More modern developments use either a voltage controlled amplifier which is very easy to mathematically predict and provides extra facilities such as 'hard and soft knee' compression, or the one we have chosen, the F.E.T. This way of controlling signal dynamics was particularly popular in the seventies and has unique characteristics of it's own. Because of the nature of the device it can provide extremely fast attack times and consequently has the ability to really control the dynamics of audio signal. The design of the compressor is based around a circuit used by Trident in the early eighties that proved very popular with many recording studios. Whilst there are many companies producing optical, tube and vca based compressors, F.E.T based designs are much rarer and normally very expensive as they need care in setting up. We have been able to minimize the setup needed and are able to offer the unique F.E.T. characteristics at an affordable price.

Operating The Compressor

All the compressor related controls, 'Attack', 'Release', 'Ratio' and 'Make Up Gain' should first be set to their minimum positions (fully anti-clockwise). The input level should be set in accordance with the instructions given in the preceding section 'Input Section'. This is very important as the compressor section works on the principle of a fixed 'threshold'. This is the preset position at which the compressor starts to operate. Signals below the 'threshold' will not be compressed and therefore the circuitry will not operate at its optimum. The 'Comp' switch should be set to the 'IN' position (led illuminated) and the 'Make Up Gain' control advanced to its midway point. Like the 'Input' control, this is set up so that in it's midway position, the unit is designed to give unity or 0dB gain. The signal on the VU meter should now read the same whether the 'Comp' switch is set to 'IN' or 'OUT'. Now switch the 'Gain Reduction' switch to the left of the meter to 'G.R.' (Gain Reduction). The meter will now indicate '0' whether signal is present or not and irrespective of signal level. This is because in 'G.R' mode the meter is designed to give an indication of the amount that the signal is being attenuated by the compressor circuit. Now advance the 'Ratio' control slowly and compression of the signal will take place. On most programme material it will not be necessary to advance the ratio control very far to get the desired effect. The 'Make Up Gain' control can be advanced clockwise to adjust for any difference in output level caused by the compressor. The 'Attack' and 'Release' control settings depend on the nature of the audio signal through the compressor. For example, a bass guitar is best processed using a slower attack time ('Attack' control advanced clockwise) for example, as the extremely fast attack time of the compressor may not be desirable on such a percussive instrument. For vocals, a fast attack time and slow release could be favoured in order to avoid 'pumping' effects common in many compressors without the range of control that the DC-2 offers. In using compressors, it is very much a case of experimentation to find what suits different instruments and different program material.

Stereo Couple Switch

The stereo couple switch links the control voltages of both sections to reduce image shifting when the DC-2 is used as a stereo compressor. It should be pointed out that like similar other F.E.T compressors such as the UREI 1176, the couple switch does not make one particular channel control the other. It is designed so that when both channels have their 'Attack', 'Ratio' and 'Release' controls set to the same positions, the channel with the greatest compression will attenuate both channels rather than just it's own. This avoids image shift as one signal decreases in level more than the other and signals for example placed in the middle of the stereo image appear to move either to the left or right.



Malcolm Toft, Designer

TROUBLESHOOTING

1) No Power.

Make sure the unit is selected for the correct mains voltage via the selector incorporated in the mains inlet socket on the back of the unit. Check the fuse (also in the mains inlet socket) if the unit has been powered with the wrong voltage.

Check there is a main supply reaching the unit.

2) The line input doesn't work.

Is it connected to the correct input on the back of the unit?

Is the 'Instr./Line' switch selected to 'LINE'

Make sure the 'Input' control is turned up.

3) The instrument input doesn't work.

Is it connected to the front panel jack socket of the appropriate channel?

Is the 'Instr./Line' switch selected to 'Instr.'?

Check the lead from the instrument.

Make sure the 'Input' control is turned up.

4) The compressor doesn't work.

Is the 'Comp In' switch selected to 'IN' ?(led illuminated).

Is the 'Ratio' control advanced clockwise?

Is the 'Make Up Gain' control advanced clockwise? (set to midway).

Is there enough signal (set by the 'Mic/Line Gain' control) to 'drive' the compressor?

DC-2 TECHNICAL SPECIFICATIONS

Input Impedance

Line:	>15K ohm electronically balanced
Instrument:	>100K ohm unbalanced

Output Impedance

x-l-r:	<100 ohm electronically balanced
Jack:	<100 ohm unbalanced

Gain

Line:	-16 to +30dB
Instrument:	36dB

Noise

Line:	<-75dBu (Eq. In, 20Hz-20kHz)
	<-70dBu (Compressor In, 20Hz-20kHz)

Maximum Levels

Line Input:	<+24dBu at all frequencies (Compressor out)
	<+15dBu at all frequencies (Compressor in)
Instrument Input:	<+24dBu at all frequencies (Compressor out)
	<+15dBu at all frequencies (Compressor in)

Distortion

Line Input:	<0.05% T.H.D. (+4dBu input, +4dBu output)
Instrument Input:	<0.05% T.H.D. (-30dBu input, +4dBu output)
Compressor:	<0.5% T.H.D.(maximum compression)

Frequency Response

Line Input	±1dB 20Hz to 20kHz
Instrument Input:	±1dB 20Hz to 20kHz

Nominal Operating Level +4dBu

In accordance with our policy of continuing product improvement, we reserve the right to alter specifications without prior notice.

TOFT AUDIO DESIGNS LIMITED WARRANTY

THIS PRODUCT IS FOR PROFESSIONAL USE ONLY

PMI Audio Group warrants that all products will be free from defects in material or workmanship:

A: For a period of (3) three years from the date of purchase (hereinafter the labor warranty period), PMI Audio Group will repair or replace this Product if determined to be defective. After the expiration of the labor warranty period, the Purchaser must pay labor charges.

B: In addition, PMI Audio Group will supply, at no charge, replacements for defective parts for a period of (three years) from the date of purchase. During the labor warranty period, to repair the Product, Purchaser must return the defective Product, freight prepaid, or deliver it to PMI Audio Group Service Center. The product to be repaired is to be returned in either its original carton or a similar package affording an equal degree of protection. PMI Audio Group will return the repaired Product freight prepaid to the Purchaser. PMI Audio Group is not obligated to provide Purchaser with a substitute unit during the warranty period or at any time.

CONDITIONS

1. Notification of claims: Warranty Service: If Purchaser discovers that the Product has proven defective in material or workmanship, then written notice with an explanation of the claim shall be given promptly by Purchaser to PMI but all claims for warranty service must be made within the warranty period. If after investigation PMI determines that the reported problem was not covered by the warranty, Purchaser shall pay PMI for the cost of investigating the problem at its then prevailing time-and-materials rate. No repair or replacement by Purchaser of any Product or part thereof shall extend the warranty period as to the entire Product. The specific warranty on the repaired part only shall be in effect for a period of ninety (90) days following the repair or replacement of that part or the remaining period of the Product warranty, whichever is greater.

2. Exclusive Remedy: Acceptance: Purchaser's exclusive remedy and PMI's sole obligation is to supply (or pay for) all labor necessary to repair any product found to be defective within the warranty period and to supply, at no extra charge, new or rebuilt replacements for defective parts. If repair or replacement fails to remedy the defect, then and only in such an event, shall PMI exchange to Purchaser a new or reconditioned unit. Purchaser's failure to make a claim as provided in paragraph 1 above or continued use of the product shall constitute an unqualified acceptance of such Product and a waiver by Purchaser of all claims thereto.

3. Exceptions to Limited warranty: PMI shall have no liability or obligation to Purchaser with respect to any Product subjected to abuse, improper use, negligence, accident, modification, failure of the end-user to follow the operating and maintenance procedures outlined in the users manual, attempted repair by non-qualified personnel, operation of the unit outside of the published environmental and electrical parameters, or if such products original identification (trademark, serial number) markings have been defaced, altered, or removed. PMI excludes from warranty coverage, Products sold AS IS and/or WITH ALL FAULTS and excludes used products which have not been sold by PMI to the Purchaser. PMI also excludes from warranty coverage consumables such as fuses and batteries, tubes, etc.

4. Proof of purchase: The dealer's dated bill of sale must be retained as evidence or the date of purchase and to establish warranty eligibility

DISCLAIMER OF WARRANTY

EXCEPT FOR THE FORGOING WARRANTIES, PMI HEREBY DISCLAIMS AND EXCLUDES ALL OTHER WARRANTIES, EXPRESS OR LIMITED, INCLUDING, BUT NOT LIMITED TO ANY/OR ALL IMPLIED WARRANTIES OF MERCHANT ABILITY, FITNESS FOR A PARTICULAR PURPOSE AND/OR ANY WARRANTY WITH REGARD TO ANY CLAIM OF INFRINGEMENT THAT MAY BE PROVED IN SECTION 2-312(3) OF THE UNIFORM COMMERCIAL CODE AND/OR IN ANY COMPARABLE STATE STATUE. PMI HEREBY DISCLAIMS ANY REPRESENTATIONS OR WARRANTY THAT THE PRODUCT IS COMPATIBLE WITH ANY COMBINATION OF NON-PMI AUDIO PRODUCTS PURCHASER MAY CHOOSE TO CONNECT TO THE PRODUCT.

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THE LIABILITY OF PMI, IF ANY, AND PURCHASER'S SOLE AND EXCLUSIVE REMEDY FOR DAMAGES FOR ANY CLAIM OF ANY KIND WHATSOEVER, REGARDLESS OF THE LEGAL THEORY AND WHETHER ARISING IN TORT OR CONTRACT, SHALL NOT BE GREATER THAN THE ACTUAL PURCHASE PRICE OF THE PRODUCT WITH RESPECT TO WHICH SUCH CLAIM IS MADE. IN NO EVENT SHALL PMI BE LIABLE TO PURCHASER FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND INCLUDING, BUT NOT LIMITED TO, COMPENSATION, REIMBURSEMENT OR DAMAGES ON ACCOUNT OF THE LOSS OF PRESENT OR PROSPECTIVE PROFITS OR ANY OTHER REASON WHATSOEVER.

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Comments: _____

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What magazines do you read to influence your buying decision: (please check all that apply)

❑ MIX ❑ Electronic Musician ❑ EQ ❑ Home Recording ❑ Pro Audio Review ❑ Recording ❑ Pro Sound News