

# **DRAWMER**



## **MULTI-CHANNEL SURROUND DYNAMICS**

### **OPERATORS MANUAL**

#### **CONTENTS**

SAFETY CONSIDERATIONS	page 1
INTRODUCTION	page 2
INSTALLATION	page 2
POWER CONNECTION	Page 2
AUDIO CONNECTIONS	Page 3
CONTROL DESCRIPTIONS	page 5
OPERATION	page 8
IF A FAULT DEVELOPS	page 10
CONTACTING DRAWMER	page 10
TECHNICAL SPECIFICATION	page 11
BLOCK DIAGRAM	page 12

## **COPYRIGHT**

This manual is copyrighted © 2001 by Drawmer Electronics, Ltd. With all rights reserved. Under copyright laws, this manual may not be duplicated in whole or in part without the written consent of Drawmer.

## **ONE YEAR LIMITED WARRANTY**

Drawmer Electronics Ltd., warrants the Drawmer "Six-Pack" audio processor 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.

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.

---

# *DRAWMER* Six-Pack Multi-Channel Surround Dynamics



## SAFETY CONSIDERATIONS



### CAUTION - MAINS FUSE

TO REDUCE THE RISK OF FIRE REPLACE THE MAINS FUSE ONLY WITH A FUSE THAT **CONFORMS TO BS EN 60127-2:1991 SHEET III**. 250 VOLT WORKING, TIME DELAY TYPE AND BODY SIZE OF 20mm x 5mm. THE MAINS INPUT FUSE MUST BE RATED AT T250mA.

### 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



## INTRODUCTION

The Drawmer SixPack is a six channel Expander/Compressor/Limiter with extensive linking facilities which allow for the various configurations commonly used in multi-channel surround processing as well as the more conventional stereo and single channel operation.

Each channel has a program adaptive expander, with variable threshold and release times, followed by a soft knee compressor with optional auto attack and release as well as the normal manual controls. A variable threshold, zero-overshoot limiter provides total protection against even the fastest transients and is particularly valuable in live sound applications for driver protection.

An optional 120Hz filter on channel 6 may be used to create the LFE channel from a 5-1 mono mix.

Each channel of the SixPack has balanced XLR inputs and outputs, with relay hard wire bypass, so signals still pass through the unit when the power is off.

Powered by a universal switch mode power supply, the SixPack 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.

---

## INSTALLATION

The "Six-Pack" is designed for standard 19" rack mounting and occupies 3U of rack space. Avoid mounting the unit directly above power amplifiers or power supplies that radiate significant amounts of heat. Fibre or plastic washers may be used to prevent the front panel becoming marked by the mounting bolts.

---

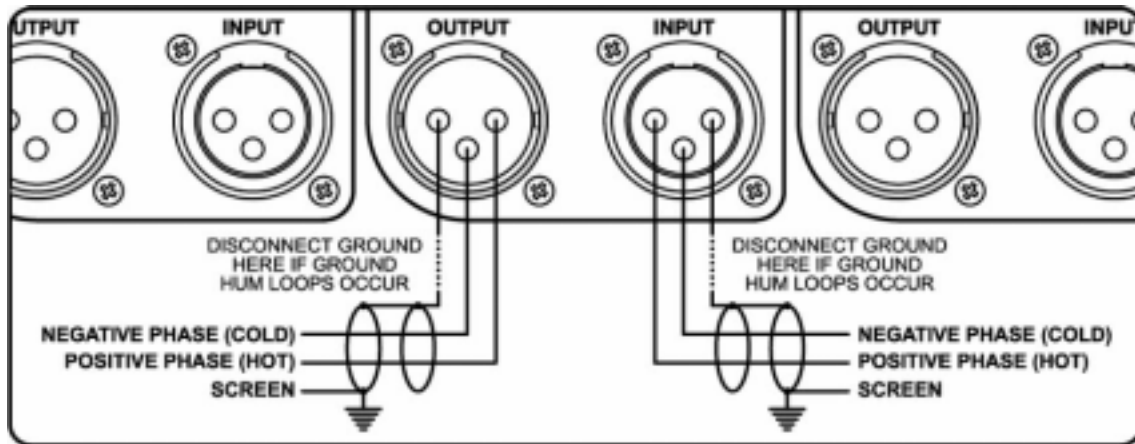
## POWER CONNECTION

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 SixPack 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.

## AUDIO CONNECTIONS

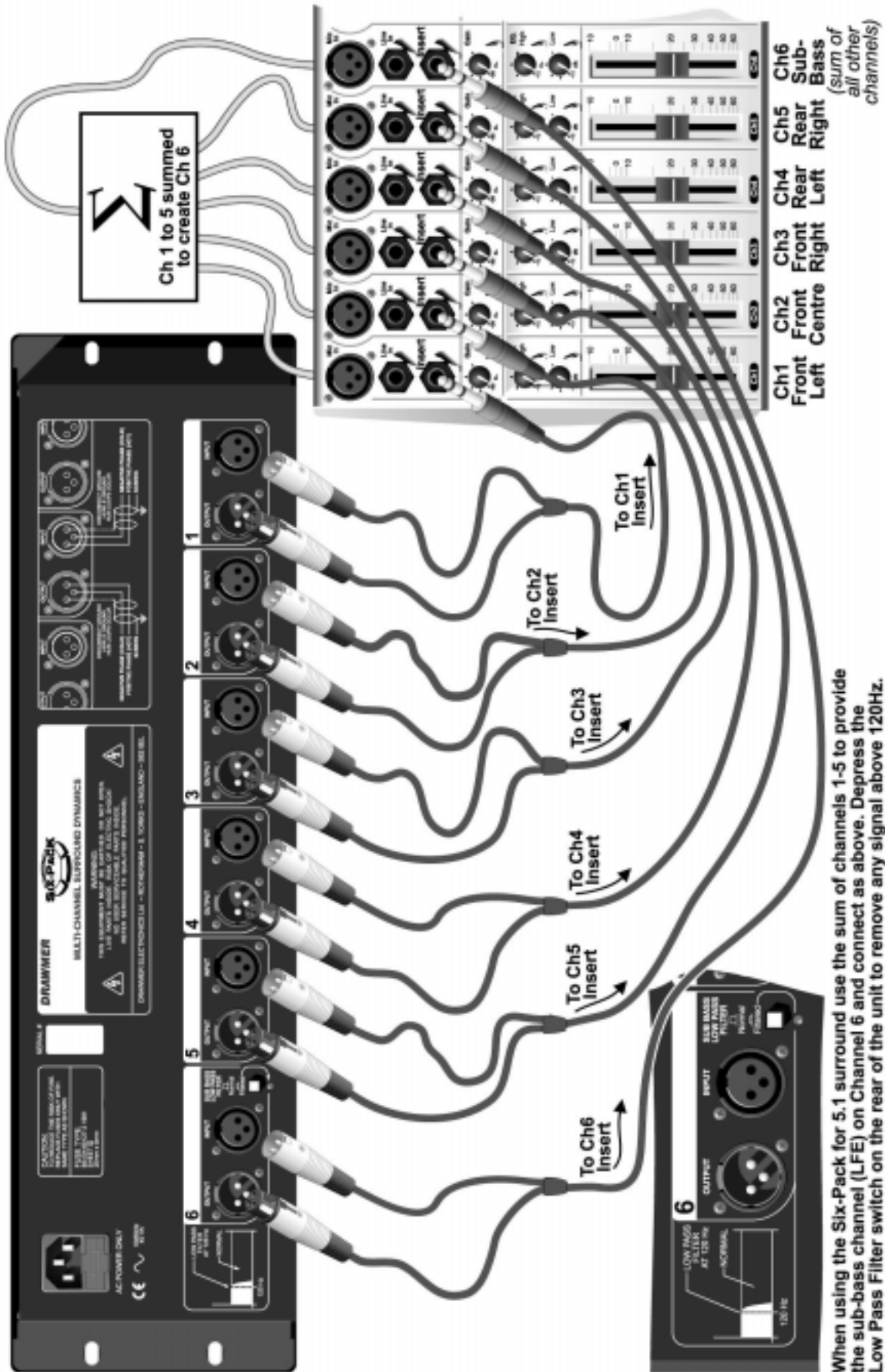
Both the input and output connectors may be used either balanced or unbalanced, the wiring convention for XLR connectors being: pin 2 hot, pin 3 cold and pin 1 ground. Unbalanced operation is achieved by shorting pin 3 of the XLR connector to ground (pin 1) at both input and output.



**Interference:** If the unit is to be used where it maybe exposed to high levels of disturbance such as found close to a TV or radio transmitter, we advise that the unit is operated in a balanced configuration. The screens of the signal cables should be connected to the chassis connection on the XLR connector as opposed to connecting to pin1. The "Six-Pack" conforms to the EMC standards.

**Ground Loops:** If ground loop problems are encountered, **never** disconnect the mains earth, but instead, try disconnecting the signal screen on one end of each of the cables connecting the outputs of the Six-Pack to the patchbay. If such measures are necessary, balanced operation is recommended.

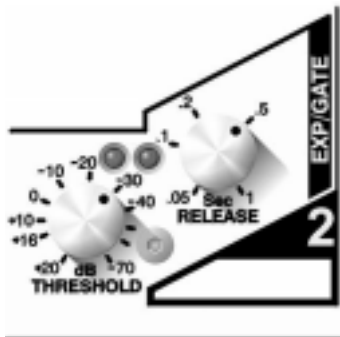
## Connecting the Six-Pack to a 5.1 Surround Mixing Desk



When using the Six-Pack for 5.1 surround use the sum of channels 1-5 to provide the sub-bass channel (LFE) on Channel 6 and connect as above. Depress the Low Pass Filter switch on the rear of the unit to remove any signal above 120Hz.

## CONTROL DESCRIPTION

All six channels of the "Six-Pack" are identical and may be used completely independently or linked for 5.1 surround operation.



### EXPANDER



**Threshold:**

Range -70dB to +20dB.

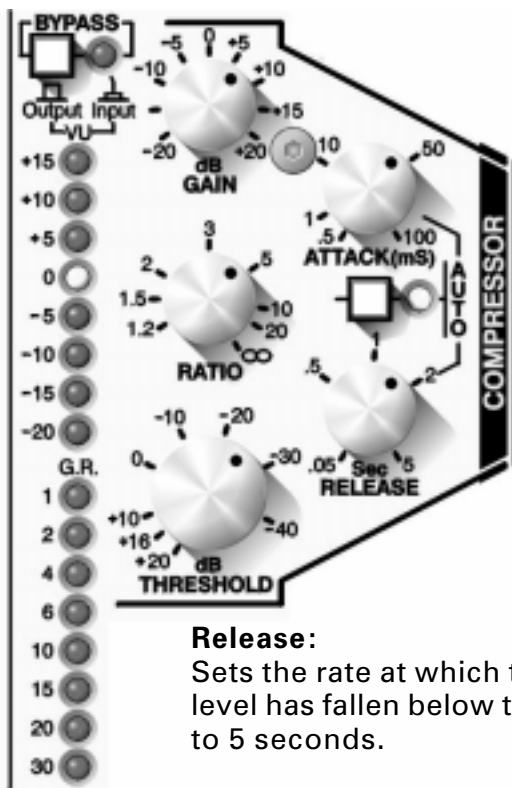
This control sets the level below which expansion starts to take place. When the expander starts to operate, the red status LED will come on. Note: because the expansion ratio varies with signal level, it is possible to arrive at a situation where the red expansion LED may be illuminated when little or no perceived gain reduction is taking place. This means that the expansion Threshold may need to be set a little higher than it would with a

conventional expander and final setting is best done by ear. The adaptive expansion system used in the "Six-Pack" means, however, that setting up is not over-critical and the gating action is far more progressive.

**Release:**



A release time of between 0.05 to 1 Second may be selected depending on the material being processed. Percussive material with little or no reverb is generally treated using a faster release setting, whereas material with slow decays or a significant amount of added reverberation will usually respond better to a longer release setting.



### COMPRESSOR

**Threshold:**

Determines the input level above which gain reduction will be applied and may be set in the range -40 to +20dB. Soft knee compression takes place for signals exceeding the threshold level by up to 10dB above which level, conventional 'ratio' compression is applied.

**Ratio:**

Sets the final compression ratio that will be applied once the 10dB 'soft-knee' region is exceeded. The ratio may be continuously adjusted from 1.2:1 to infinity:1 allowing the possibility of true hard limiting.

**Release:**

Sets the rate at which the system gain returns to normal after the input signal level has fallen below the threshold. This may be set in the range 0.05 seconds to 5 seconds.

**Attack:**

Sets the rate at which the compressor will respond to input signals that exceed the threshold level. This may be set in the range 0.5mS to 100mS.

**Auto:** When selected, Auto disables the Attack and Release controls and continually optimises the attack and release times to suit the dynamics of the material being processed. In general, this setting will produce the least obtrusive level control on signals with widely varying dynamics or complete mixes.

**Gain:** The output level may be attenuated or amplified by up to 20dB to compensate for level changes caused by compression and limiting. This control comes before the Peak limiter detector and this fact should be taken into account when setting the Peak limiter threshold.

### Gain Reduction

**Meter:** An eight segment LED bargraph meter continuously monitors the gain reduction applied by the compressor/limiter over the range 0 to 30dB.

### Output

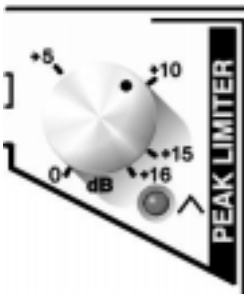
**Level Meter** This is an 8 segment LED bargraph level meter that monitors the level of the output signal over the range -20dB to +15dB.

**Bypass:** This switch causes a 'hard-wire' bypass function of all signal processing for this channel, where the input socket is routed directly to the output socket. This feature enables the unit to pass audio even with no power applied to the "Six-Pack". Normally the switch is used to compare the raw unprocessed signal verses with any expansion, compression and limiting of the audio input. When in bypass the level metre shows the unmodified input signal coming into that particular channel.

## PEAK LIMITER

### Level:

Sets an absolute limit to the level that the output signal will not be permitted to exceed. This limiter is very fast acting enabling it to control any peaks without audible distortion. If the output signal is so high as to cause the limiter to operate for more than 20mS, the system gain is automatically reduced to bring the signal back within range. The system gain is then returned to normal over a period of approximately one second. The compressor Gain control should be used to ensure that the peak limiter operates only rarely if at all, if it is to be used purely for peak protection. Alternatively, it may be deliberately driven into limiting to produce creative effects. The red LED comes on when the limiter is active.



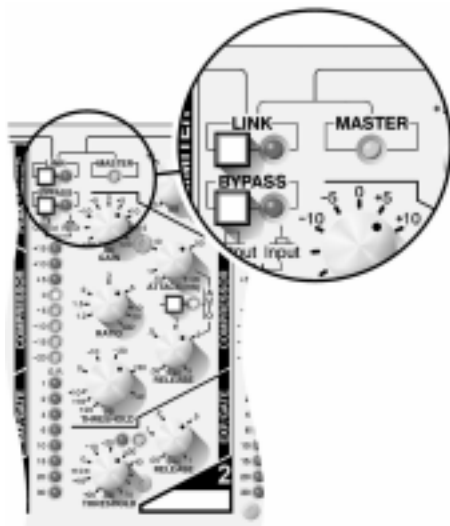


# LINKING

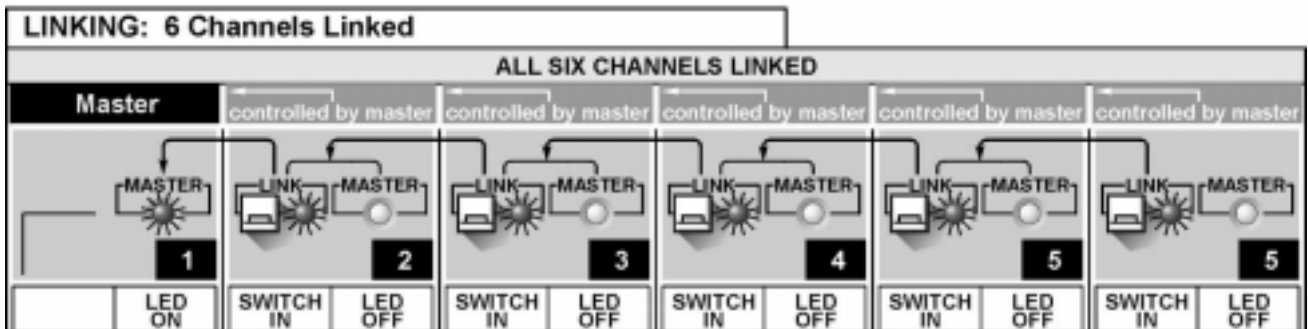
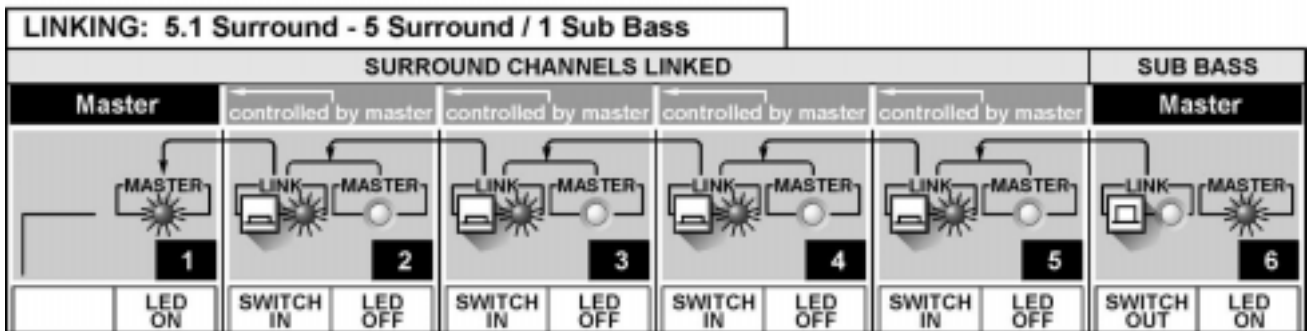
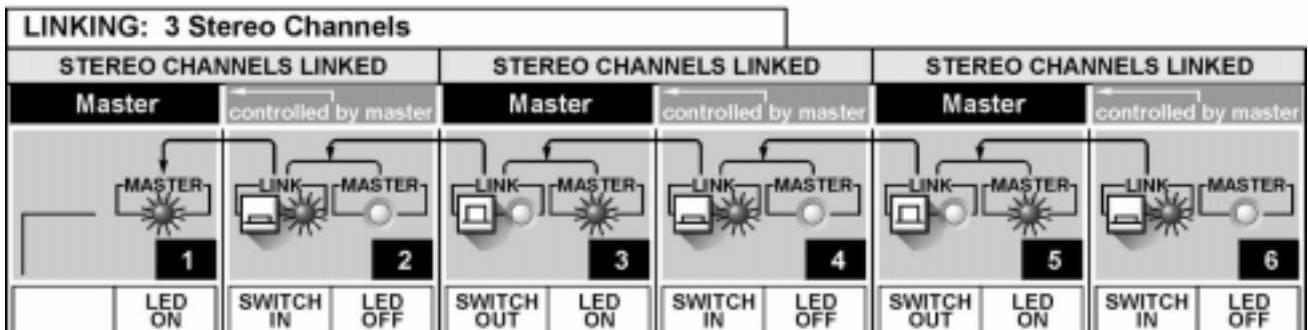
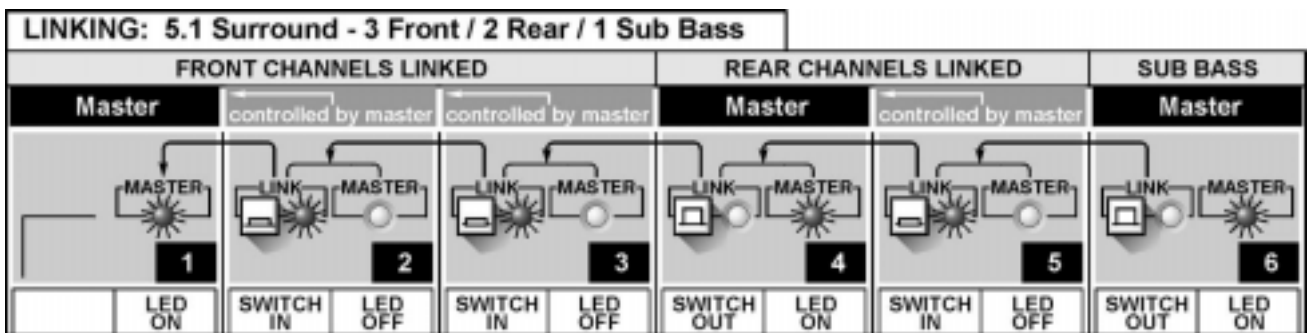
## Link:

Pressing the link switch on any channel causes it to be linked to and completely controlled from, the previous channel (to the left). Therefore, pressing link on channel 2, will link channels 1 and 2, with channel 1 being the master channel. In addition, pressing link on channels 2 and 3 will link channels 1,2 and 3 with channel 1 being the master.

All channels show Master or Linked status.  
Channel 1 is always a master channel.



The following diagram shows the more commonly used linking configurations:



---

## OPERATION

The unit should be connected in line with the signal to be processed via suitable insert points. For single channel use, each channel may be considered as being completely independent and set up accordingly. For use with stereo or multi-channel signals such as complete mixes or submixes, the unit should be switched to Link mode and all setting up done using the master channel controls.

Setting up is simpler if the Expander is initially turned off and the Peak Limiter threshold set to maximum. This allows the Compressor/Limiter to be set up in isolation. The ratio setting depends on how firmly the signal dynamics need controlling; as a rule, higher ratios provide a higher degree of control but also tend to be more audible in operation when high levels of gain reduction are required. The integral soft-knee feature of the "Six-Pack" renders these effects far less pronounced, but this factor should still be taken into consideration when setting up. In general, a higher compression ratio may be used than on a conventional compressor without compromising the sound quality.

If the Attack and Release controls are switched to Auto, setting up is now simply a matter of adjusting the Threshold control until the desired amount of gain reduction occurs. This is judged partly by ear and partly by observing the gain reduction meter. In general, a maximum gain reduction of between 8dB and 12dB will be adequate. If more gain reduction appears necessary, consider applying a conservative degree of compression during recording and then further compression while mixing.

Compressing during a mix does increase the subjective level of tape and other background noises during pauses and quiet passages but, unless the noise contamination is serious, the expander section will be able to attenuate it to a very high degree without compromising the wanted signal.

At this point, the Auto control may be switched off if it is desired to set the attack and release times manually. The longer the attack time, the longer the compressor takes to respond to increases in signal level and a slow attack time is often used to accentuate the beginning of percussive or plucked sounds such as drums, basses and guitars. A fast attack time will bring the input signal under control very quickly.

The release time should be set short enough so that the system gain has returned to normal before the next peak occurs and, in general, it should be set as short as possible before audible gain pumping occurs.

At this point, the expander threshold may be set up and you should adjust the release time settings to the least obtrusive in operation. For all but sharp percussive sounds, a longer setting is likely to give the best results. Set the threshold using a piece of program material that contains pauses and adjust the threshold to be as low a dB level as possible while still attenuating the noise during pauses. Listen carefully to how the sounds come in after the pauses and how cleanly they fade away again. If you can hear the expander changing the sound in an unacceptable way, then the threshold is probably set too high.

Because the expander is self-adapting to the programme dynamics, it should be possible to obtain far more satisfactory results than are possible with conventional expanders. By the same token, do not assume that because the expander threshold LED flickers during a piece of quiet but wanted material that it is having a detrimental effect. When it first comes into play, the ratio of expansion is very low so trust your ears!

---

Finally, set the Gain control to give the required output level using the level meter to guide you. Avoid running at very high output levels as this reduces the available amount of signal head room and could lead to distortion in extreme cases. Once the gain is correct, set the Peak Limiter Level control so that the limiter LED only lights briefly on extreme signal peaks. Alternatively, set the Peak limiter Level to the desired value and then adjust the compressor Gain control to ensure minimum limiter activity.

If required, the expander may be used on its own with the compressor and limiter functions disabled. The Peak limiter has no separate on / off control, but turning the Level control fully clockwise will prevent any unwanted limiter action. To effectively bypass the compressor section turn the compressor Threshold up to its maximum of +20dB (fully counter-clockwise), set the Ratio to its lowest setting of 1.2:1 and adjust the Gain to approximately 0dB.

---

## **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 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 St.: Parkgate : Rotherham : S62 6EL : UK

or, E-mail us on :

[tech@drawmer.com](mailto: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

(Measurements taken at +4dBu operating level where applicable)

<b>INPUT IMPEDANCE</b>	20K $\Omega$
<b>MAXIMUM INPUT LEVEL</b>	+20dBu
<b>OUTPUT IMPEDANCE</b>	100 $\Omega$ (bal)
<b>MAXIMUM OUTPUT LEVEL</b>	+16dBu
<b>BANDWIDTH (-1dB)</b>	<18Hz to 68KHz
<b>NOISE AT UNITY GAIN</b>	-100dB
<b>DISTORTION</b>	0.03%
<b>LOW PASS FILTER (-3dB)</b>	120Hz 24dB/Octave
<b>POWER REQUIREMENTS</b>	30VA
<b>FUSE RATING</b>	T250mA CONFORMING TO BS EN 60127-2:1991 SHEET III
<b>FUSE TYPE</b>	20mm x 5mm, Class 3 Slo-Blow, 250Volt working
<b>CASE SIZE</b>	482mm (w) x 132mm (h) x 200mm (d)
<b>WEIGHT (incl packaging)</b>	7 Kgs

---

# BLOCK DIAGRAM

