

JOEMEEK

COMPRESSION

VC1 Studio Channel v3



transformer mic pre amp

photo optical compressor

enhancer

*"If it sounds right; it is right."
Joe Meek 1964*

VCI Studio Channel - User's guide

INSTRUCTION BOOK CONTENTS

The JOEMEEK Studio Channel - What it is and why	3
Front panel controls	4
Types of inputs	6
The compressor	7
The enhancer	11
The Gain make-up amplifier	12
Connecting up the equipment	13
Technical specification	14
Regulations and safety - Warranty	16 16

Ted Fletcher

This instruction book was written by Ted Fletcher; the designer of the original JOEMEEK compressor and the whole JOEMEEK range of professional audio equipment. Ted worked in the studio with Joe Meek, the legendary record producer, in the mid 1960s.

THE JOEMEEK Studio Channel VC1

The JOEMEEK STUDIO CHANNEL VC1 is a development of historic tried and tested circuits and designs from the 1960's to the present day, combined in a single outboard rack unit by acknowledged leaders in analogue technology.

WHAT IT IS AND WHY:

The JOEMEEK Studio Channel is the result of continuing experimental and development work carried out over a 3 year period to incorporate the best of historically excellent sounding technology in a single package to bring the finest possible sounds within the reach of the studios of today.

It's best to think of the Studio Channel as four separate pieces of equipment:

- 1) The Input amplifier.
- 2) The Compressor.
- 3) The Enhancer.
- 4) The Gain make-up.

THE INPUT AMPLIFIER

The microphone amplifier takes the audio signals from any microphone and amplifies them up to 'line' level; that is, from a few millivolts, up to about a volt.

This function is not too difficult and the microphone amplifiers on normal professional mixers do it quite well; BUT they cut costs and corners.

The JOEMEEK Studio Channel has an uncompromising old fashioned approach, it uses a transformer at the input and two separate amplification stages linked to provide lowest possible noise and distortion. By using the finest components available for the purpose, and with proven high overload amplifier design developed over many years, the performance is startlingly good and silky smooth in sound.

The JOEMEEK Studio Channel is designed for the best capacitor microphones; it is particularly good with the Neumann range, the AKG C3000 and C414, Microtech Gefell, and Audio Technica. A new design of phantom power system assures adequate power for any 48V phantom microphone.

Dynamic or ribbon microphones should be used with the phantom power

turned off, then full advantage can be taken of the extreme low noise performance of this amplifier.

PHASE SHIFT and QUALITY

It's Fletcher Company theory that 'big' sounds are only possible if the recording channel keeps the response and phase of the lower frequencies flat and under control. To achieve this, the JOEMEEK Studio Channel has an extended frequency range down below 10Hz. This ensures that there are no sudden phase shifts in the low end. The proof of the theory is that the sound from the Studio Channel is characteristically full bodied and rounded in character.

Such extreme LF response can often bring its own problems so a 'subsonic' (High Pass) filter can be switched in with a front panel push-button.

OVERLOAD MARGINS.

In the mid 1970s Ted Fletcher designed a range of mixers specifically for use by the Independent Broadcasting Authority and the BBC. One of the specification clauses insisted on by them was an extreme overload margin in the microphone amplifier.

The reason was that although momentary overloads (transients) are not audible, they have an effect on perceived quality. A high overload margin amplifier just sounds better.

Nowadays, many of these notions have been forgotten and 'quality' electronics is getting rarer and rarer. But the JOEMEEK Studio Channel applies these professional rules and achieves a clean transparent sound.

THE FRONT PANEL CONTROLS

MIC/LINE SWITCH has an LED indicator to show when 'LINE' has been selected. Press the button in for 'MICROPHONE' (or 'INSTRUMENT') input.

PHANTOM POWER SWITCH. Press this switch to select 48V phantom power for capacitor microphones such as the JOEMEEK JM47. A red LED shows that phantom power is selected. Do not switch on phantom power when dynamic microphones are being used.

HIGH PASS FILTER SWITCH selects a filter which cuts out low frequency

VC1 Studio Channel - User's guide

rumbles. A green LED shows that it is in circuit.

PHASE SWITCH reverses the phase of the VC1 (any input). This is useful to correct for some microphone placements in the studio.

INPUT GAIN is a rotary control which sets the electronic gain of the 'front end' of the VC1. It operates on mic in and line in. COMP SWITCH switches on the compressor (and the blue LED). COMPRESSION is a rotary control that sets the amount of compression.

SLOPE is a 5 way rotary switch that sets the ratio ranges of the compressor.

ATTACK is a rotary control that determines the time for the compression effect to work. A short attack makes the compressor less obvious in operation.

RELEASE is a rotary control that sets the time for the compression to 'lift off' the audio signal.

VU METER shows either audio volume level within the VC1 (before the output control) or the amount of compression being applied.

VU SWITCH selects 'compression' or 'VU' mode for the VU meter.

ENHANCE SWITCH selects the enhancer. An LED shows that it is in circuit.

DRIVE is a rotary control that sets the amount of high frequencies that are fed to the enhancer 'sidechain'.

'Q' is a rotary control that sets the bandwidth of the enhance effect. This changes the sound of the enhancer.

ENHANCE is the rotary control that sets the amount of enhance effect that is returned and mixed with the audio signal.

OUTPUT sets the main output volume level of the VC1. It does NOT change the reading on the VU meter(it is connected after the meter).

3 TYPES OF INPUTS

The Studio Channel is optimised for the three main types of inputs found in recording studios.

XLR Microphone inputs are on the front and rear of the unit.

On the rear of the unit, the line input is balanced and is suitable for use with any other 'zero level' studio equipment. The balancing circuit is electronically floating balanced using the 'Superbal' electronic circuit designed by Ted Fletcher in the mid 70's. The circuit gives excellent rejection of electrical interference.

On the front of the unit there is an unbalanced 'instrument' input designed with gain and impedance specifically for guitars or basses. Use of this socket disables the rear line input.

BALANCED AND UNBALANCED

The JOEMEEK Studio Channel is designed to be used in the best studios where most (if not all) interconnections are 'balanced'. Balanced operation means that the audio is carried on two wires working in opposite phase. Then should any interference appear on the 'line' , it will be effectively cancelled out .

Both of the main inputs (Microphone and Line) and the two main outputs are accurately balanced to get best advantage from true balanced operation; but unbalanced operation (for line level signals) will NOT degrade the performance unless very long cables are used (above 50 metres).

OPERATING THE MICROPHONE AMPLIFIER

Press in the 'MIC/LINE' switch. (in for MIC and out for LINE).

Turn the INPUT GAIN knob down to minimum then, If you are using a capacitor microphone, plug in the microphone, then switch on the phantom power by pressing in the 'Phantom' switch. (Do it in that order). NOTE. Some phantom powered microphones take several minutes to reach correct working conditions. Remember to switch on at least 5 minutes before using the microphone.

CAUTION. When using phantom power, DO NOT USE UNBALANCED MICROPHONES. It will damage (magnetise) the input transformer.

Turn up the INPUT GAIN until sound registers on the VU meter (VU switch in). Do not let the VU needle hit the end stop too hard or overload may possibly happen. The meter electronics has been adjusted so that it is normal for the needle to move in the red area.

OVERLOAD MARGIN AND THE VU. METER

For steady tones, the '0' on the VU meter corresponds to 0dBu (Where 0dBu is 0.775v RMS on the line output with the output control set at '0').

This setting of '0' is to allow for the considerable under-read that occurs with all VU meters with music signals. It is normal for the peaks of signals to go to +10dBu while the VU meter reads only '0'. In practice, when the VU meter is peaking at or just above '0' the music signal will be well within normal limits and will have a significant overload margin. Even with the needle hitting the end stop, the signal will not be distorted; although the overload margin will be reduced.

(The VU meter is connected before the output gain control)

THE COMPRESSOR

And now for the part of the JOEMEEK Studio Channel that gives it character; - the compressor.

The compressor is a photoelectric device where the sound triggers light emitting diodes which in turn control the resistance of a photo sensitive resistor. This form of compression used to be common in the 60's and 70's but has been superseded by so called 'improved' voltage controlled amplifiers. The advantages of the older system are that distortion is virtually nil, noise is extremely low while overload margin is extremely good. The disadvantages are that the design is more difficult to produce cheaply and, according to those who judge equipment by specifications and not by listening, the older design is less flexible in operation and more difficult to use (!).

Using 1990's electronics for the control circuitry, Ted Fletcher has recreated the compressed sound of the 60's; a sound that was unlikely ever to be heard again. Totally unlike a modern compressor, it can pull voices forward, help with internal mix balance, and add 'presence' to the sound as well as

controlling recording volume levels. But its main and unique attribute is its ability to produce the characteristic 60's compressed exciting sound without losing the transient sparkles that are such a feature of good digital recording.

THE COMPRESSOR; TECHNICALLY

To get the best use out of the compressor it is necessary to understand the basic physics and what it is designed to do.

A LIMITER is a device which stops the output of a signal path going above a predetermined level.

A COMPRESSOR is a device which reduces the dynamic range of programme material.

WHAT IS A COMPRESSOR?

A perfect compressor is an amplifier where the input/output ratio is constant: So using a 2:1 compressor, increasing the input by 2dB gives a corresponding 1dB increase in the output.

Early compressors which used variable mu thermionic tubes or photoelectric devices only approximated true compression over a limited range. They had a soft 'threshold' where compression started and held to a predictable ratio up to a certain level, then they returned to a more linear amplification allowing transients through. This is in stark contrast to modern VCA compressor/limiters where designers latched onto the idea that a compressor should be entirely linear in its compression characteristic (regardless of the sound produced) and thought it 'sensible' to combine the functions of compressor and limiter to 'stonewall' any and all signals above a certain level.

The musical effect is that VCA compressors sound muddy and flat, while the historic compressors sound lively and retain sparkle.

But all compressors change the sound to some extent. The JOEMEEK Studio Channel compressor adds 'punch' and 'bite' without the dull muddiness of all others.

USING THE COMPRESSOR

A compressor IN/OUT switch is fitted. When this switch is pressed the blue LED indicator alongside the switch is activated.

To USE the compressor, set the COMPRESSION control to somewhere near full up.

Set SLOPE to number 4.

Set ATTACK to minimum (full anticlock) you can increase this setting to achieve more interesting compression effects.

Set RELEASE to halfway the release control at this setting will make the compressor act to moderately control the gain, at higher the settings, sudden loud noises will cause the signal to remain compressed for longer thereby restricting the gain more.

Switch the VU meter to 'COMP. METER' (switch out). - Don't forget to turn up the output volume control too.

If there is sufficient audio signal from the input amplifiers, the meter will start to indicate compression by the needle moving downwards.

The compressor should now be working and ears can take over the adjustments.

The amount of compression in use can be seen from the VU meter; but also a flickering red LED is fitted to show the depth of compression;- this is particularly useful during a busy session!

CONTROL EXPLANATIONS

'COMPRESSION' simply adds gain to the compression sidechain and so increases compression. In simple terms this changes the 'threshold' of the compression although with this compressor the 'threshold' is not clearly defined; the compression starts very gradually and the compression ratio changes radically with programme content and amplitude.

For practical purposes, winding up the compression control increases the amount of compression. In use, all controls are interrelated.

'SLOPE' This 5 way switch sets the ratio of compression. Setting '1' is very gentle compression while '5' can give 'pumping' effects, especially with a shorter release time.

'ATTACK' sets the time that the compressor takes to act. At minimum (fastest) it is possible to make it 'overshoot' on some percussive programme material: This means that the compression electronics are driven hard before the gain has been controlled by the light cells. The cells catch up

and overcompress momentarily giving a tiny dip immediately following the start of the 'note'. This is best demonstrated when recording drums. With Slope set to maximum, and attack and release to fastest. Used sparingly this can contribute to musical drive.

Slower attacks are used where the compression needs to be less obvious.

'RELEASE' sets the time during which the path gain returns to normal after compression. Generally, the longer the time, the less obvious is the compression.

AMOUNTS OF COMPRESSION.

There can be no rule as to the correct amount of compression for any particular programme material. Compression (particularly the **JOEMEER** compressor) is a creative effect for the producer.

In rock music, it is possible to use considerable amounts of compression (10dB or more) and still for the effect to be slight. In classical recording, conventional compression is frowned upon but the **JOEMEER** compressor can be used to great effect if handled gently.

COMPRESSION PROBLEMS

1) *Got signal going through but no compression.*

Is the compressor switched in?

Is there enough signal?

- A high signal is required to make the compressor operate.

Have you turned the COMPRESSION control high enough?

- is the slope switch turned high enough?

2) *It's noisy.*

The compressor itself is extremely quiet, but by definition compressors raise the level of quiet passages; this also means that if there is noise in the microphone channel (in the audio signal that is being amplified), there will be more noise on the compressed signal. It's a compromise.

3) *It distorts.*

No it doesn't! Distortion inside the compressor is virtually impossible, however it is possible that the microphone amplifier is set with too much gain; turn down the COMPRESSION control and readjust the microphone amplifier gain.

4) *I can't make the compression gentle enough!*

It takes practice. The setting of the Attack control close to fastest is quite critical, as is the compression control.

THE ENHANCER

WHAT IS AN ENHANCER?

An enhancer (or exciter) adds a particular type of sparkle to sounds, particularly voices. It appears to create brightness from sounds that were 'flat'.

The enhancer in the JOEMEEK Studio Channel (in common with the other JOEMEEK enhancers) works by picking off the higher frequency part of the sound, compressing and dynamically

altering it, filtering off the original sound and remixing the resulting harmonics back with the signal. It adds high frequency sparkle, making singing voices sound more present and exciting without some of the other hissy effects you get from simply turning up the HF equaliser. It is the supreme 'suck-it-and-see' device. Used properly it can create beautiful sounds. Overused it can be horrible.

USING THE ENHANCER

Once a signal is going through the Studio Channel, press the 'ENHANCE' push-button (which turns on the green LED), turn up the 'DRIVE' control until the yellow Enhance LED starts to brighten on peak sounds. Turn up the ENHANCE control until the sharpening of the sound is obvious, then adjust the 'Q' control and the 'DRIVE' control to get the required effect. Like the Compress control, the ENHANCE control just adds the enhancement so if it is turned to minimum there is no effect. Once the effect is audible, experiment with the three controls to get the desired sound, the controls are very much interdependent and musically related.

'DRIVE' affects the depth and 'tone' of the enhancement.

RESONANCE or 'Q' affects the length of the high frequency harmonic after the syllable that created it.

CAUTION. If in any doubt at all, leave enhancement till the mixdown; its easy to put on but impossible to take off!

NOISE IN THE ENHANCER

Under many normal conditions of use, the enhancer has the effect of amplifying selected narrow frequency bands in the upper mid range. The danger is always to overuse the enhancer: This has the effect that any noise sounds particularly 'scratchy'. The problem is that the existence of these frequencies is common in quality recording. The effect can be reduced to almost nothing with careful use of the drive and enhance controls; but it does take practice.

NOTE; when the enhancer is not being used, keep the 'ENHANCE' control to a minimum. this will eliminate any slight noise that may be amplified by the enhancer circuitry.

THE GAIN MAKE-UP AMPLIFIER

The JOEMEEK compressor is essentially a passive piece of electronics. That means that under compression, when the audio signals are being pushed down in compression, there needs to be a high grade amplifier after it to bring the audio signal back to normal volume.

Additionally, the new Studio Channel has a gain make-up stage with an integral output volume control. The design of this stage is unusual as the volume control circuit acts around the amplifier minimising any amplifier noise.

The VU meter operates before the output gain make-up amplifier so that the VU meter can be used meaningfully at any output volume setting.

BALANCED OUTPUT

The line level output from the Studio Channel is electronically balanced with a discrete 'floating' circuit which has the capability of driving up to +26dB into balanced circuits. The circuit performs like an audio transformer.

CONNECTING UP THE EQUIPMENT

MICROPHONE

The microphone input is an XLR connector. There is a connector fitted to the front and the rear panel for convenience. **ONLY ONE OF THE CONNECTORS SHOULD BE USED AT ANY ONE TIME** they are wired in parallel. For best results the microphone used should be balanced 200 ohm impedance Connections are

Pin 1 is ground or screen.

Pin 2 is positive phase or 'hot'

Pin 3 is negative phase (or ground for unbalanced).

To avoid impulsive 'clonks' and the possibility of causing magnetising in the microphone input transformer, plug in capacitor microphones before turning on the phantom power.

LINE INPUT (REAR PANEL) - The line input is a high impedance floating balanced XLR connector input, suitable for any line level audio signal whether balanced or unbalanced. The line input is disabled when 'mic' is selected by the mic/line switch and vice-versa.

INSTRUMENT INPUT (FRONT PANEL) - The instrument input is high impedance unbalanced and is suitable for any instrument output or line level signal from unbalanced equipment.

INSERT POINT - This is used to insert another effect or outboard equipment into the Studio Channel. The microphone/line amplifier output appears on the tip of the 1/4 inch jack socket, the 'ring' is the return input. When no jack is inserted, the socket is 'normalised' (internally linked).

OUTPUTS - A 1/4 inch jack and an XLR socket provides high level balanced line outputs.

The 'HIGH LEVEL' output is low impedance balanced at zero level.

XLR Connections are

Pin 1 is ground or screen.

Pin 2 is positive phase or 'hot'

Pin 3 is negative phase (or ground for unbalanced).

GENERAL NOTE. It is important to ground the unused pin of the line when using an unbalanced output.

POWER

Mains input is 230/110V AC via the IEC socket. The socket has an integral

TECHNICAL SPECIFICATION

MICROPHONE INPUT

XLR Input 3Kohm approx. to suit 200 ohm microphones.

Transformer balanced and floating.

Switchable 48V phantom power.

Input level from -70dB to 0dB

Push button MIC/LINE switch with LED indicator for 'line'.

Push button 48V phantom supply switch with LED indicator.

LINE INPUTS

XLR input 10K impedance floating balanced.

Instrument input 150K impedance unbalanced.

OVERLOAD MARGIN

30dB on Mic and Line inputs in normal operation.

GAIN

Line in -6dB to 24dB

Instrument in 0dB to 35dB

Mic in 15dB to 70dB

Insert gain 10dB

NOISE

Line in at least 80dB below operating level

Mic in at least 125.5dB below input at 50dB gain 20Hz to 20KHz.

HARMONIC DISTORTION

Generally within 0.01% rising to approx. 0.14% at 4dB above nominal output level. 2nd harmonic predominant.

AMPLITUDE FREQUENCY RESPONSE

Line in 6Hz to 20KHz within 0.5dB

VCI Studio Channel - User's guide

Mic in 8Hz to 20KHz within 1dB

High pass filter 3dB down at 25Hz, 12dB per octave.

FILTER

Push button high pass filter switch (and indicator) operates at 100Hz at 12dB per octave.

OUTPUTS

High level balanced 50 ohm +4dBu for 0VU (variable)

Max. balanced output approx. +26dBu

Insert, Tip and Ring jack socket. 400 ohm -10dBu output 22K ohm input.

COMPRESSOR

Photoresistive servo operated

Ratio minimum approx. 1.5 to 1

Ratio maximum approx. 8 to 1 (5 position switch)

Attack time 1mS min. 7mS max. (variable)

Release time 200mS min 3S max. (variable)

ENHANCER

Performance details not released.

POWER

3.4 Watts.

IEC socket for power cable.

Reversible fuse holder for 230VAC and 115VAC power input.

HOUSING

2U rack mounting totally enclosed aluminium case.

depth approx. 250mm.

weight 1.5Kgs.

REGULATIONS AND SAFETY

The **JOEMEEK** Studio Channel has been designed and built to conform to all known safety requirements in the world. Within the European Union the Studio Channel easily meets the requirements for electrostatic and electromagnetic emissions, and conforms to all safety requirements of the European Common Market. the 'CE' symbol on the rear of the unit indicates compliance.

In the United States of America the compressor utilises UL approved components and complies with UL requirements.

WARRANTY

In the unlikely case of a breakdown, please return the unit in its original packing through the supplier.

The unit will be attended to immediately and returned to your supplier. If any breakdown occurs (excluding physical mistreatment) within 12 months of purchase no charge will be made.

LOOK OUT FOR OTHER JOEMEEK PRODUCTS!

The JOEMEEK C2, OPTICAL STEREO COMPRESSOR, to get final mixes with BIG sounds! Great for any digital recording system as a way to get results that sound warmer and with more 'punch'. Also great for tracking!



THE JOEMEEK Jm47 'Meekrophone'
True condenser 1" gold diaphragm microphone, with a transformer coupling for supreme sound. Supplied with pictured shockmount, case and 5m cable.



The JOEMEEK Stereo compressor SC2.2
Classic stereo compression for great mixes



THE JOEMEEK **Meequalizer** VC5
The 70's discrete equaliser with attitude!



Manufactured by; FLETCHER ElectroAcoustics Ltd.
Quay House, Quay Road, Newton Abbot, Devon TQ12 2BU
Tel : +44 1626 333948 Fax : +44 1626 333157
e-mail : sales@joemeek-uk.com

DECLARATION OF CONFORMITY.

This analogue audio processing equipment conforms to the standards and requirements of the European Economic Community.

The EC Harmonised standards that have been applied are;

- a) Electrical equipment (safety) Regulations 1994 (S.I. 1994/3260)
- b) Electromagnetic Compatibility Directive (89/336/EEC) incorporating (S.I. 1992/2372)

"If it sounds right; it is right"

Joe Meek, 1964