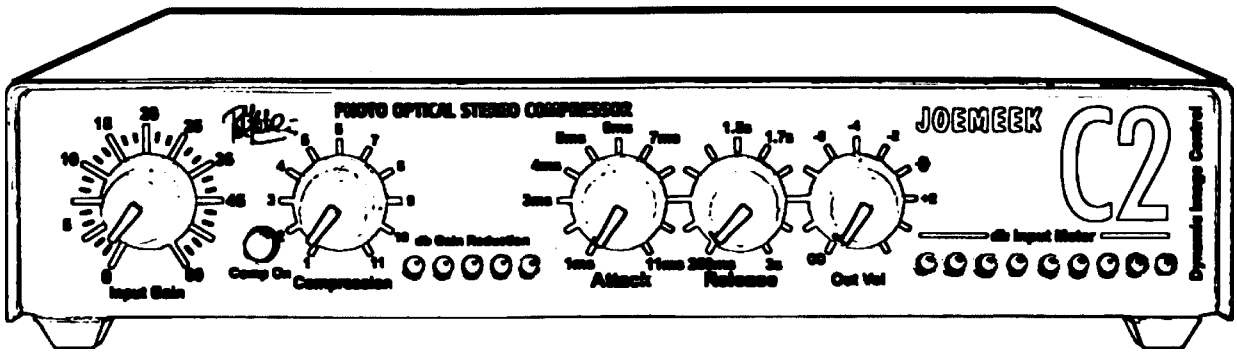
JOEMEEK C2

PHOTO OPTICAL STEREO COMPRESSOR



JOEMEEK

COMPRESSION

INSTRUCTION BOOK CONTENTS

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.

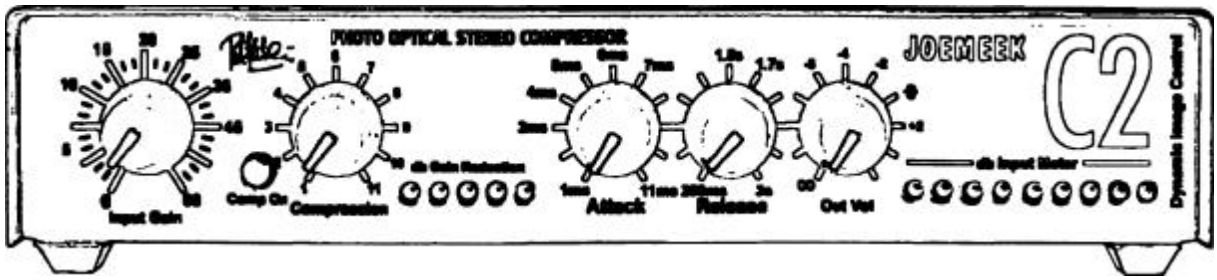
'JOEMEEK' Stereo Compressor C2

The JOEMEEK Stereo Compressors have changed the sound of records over the last 4 years; widely used by the world's leading producers and artistes they have brought a new vitality to today's music. The C2 makes the famous compressor available to a new generation of artists and musicians; it's the one that Joemeek fans have been demanding ..... An inexpensive but fully professional stereo compressor in a VC3 sized (1/2 U) package.

WHAT IS THE C2?

The JOEMEEK C2 is a true photo optical stereo compressor, designed for individual stereo/mono source compression, or final mixdown and mastering.

The C2 is capable of a very wide range of compression effects from the lightest 'tightening' of the sound, up to the heaviest 'pumping' effects needed to replicate the heaviest 60's rock sounds. The JOEMEEK C2 gives you the full sound of real photo optical compression in a package for the project studio. It offers the latest and best JOEMEEK photo optical technology, to inject your tracks with the same life and energy that has made the JOEMEEK sound famous. This means that with a C2, you will instantly get phatter sounding tracks and stereo mixes out of your studio.

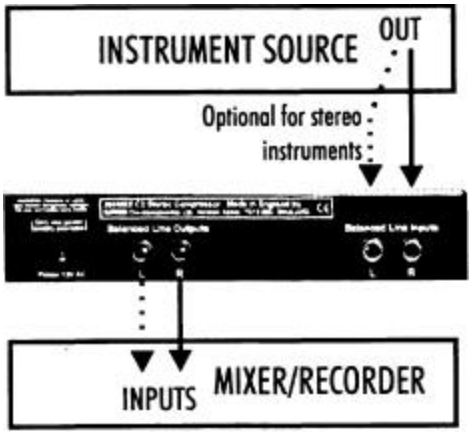


HOW WOULD I USE THE C2?

The C2 stereo Compressor can be used in 4 main ways:

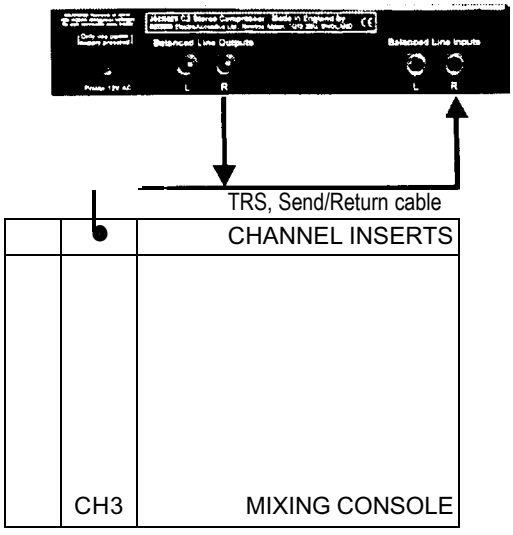
1)As an input compressor for a stereo or mono instrument or source.

To use it in this way, simply plug the instrument into the input of the C2, and plug the output of the C2 into an input in your mixer or recorder. The C2 has been designed to give sufficient gain to operate in this way from most outputs of keyboards etc. NOTE. The C2 is NOT suitable for direct connection ofmicrophones.



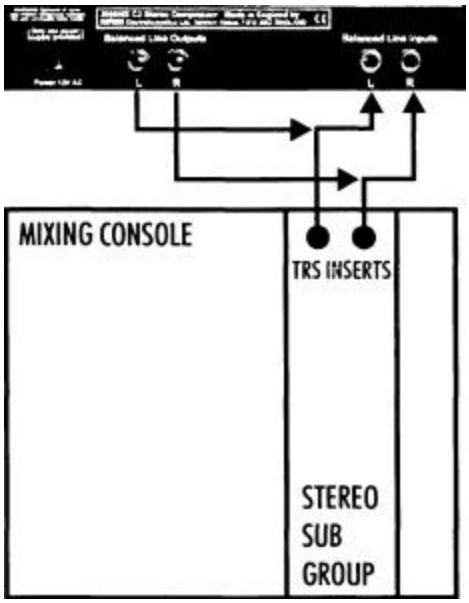
2) As a mono or stereo channel 'insert'

For this sort of operation you will have a mixer with channel insert points. These are usually 3 pole jack sockets where the output of the channel is the 'tip' and the returning input is the 'ring' of the jack. You will need a couple of special cables made up as 'insert' splitters so that the output from the 'tip' can be plugged to the compressor input, and the compressor output can return to the 'ring'. The C2 can be used either as a single mono channel or in a pair of channels (or stereo channel).



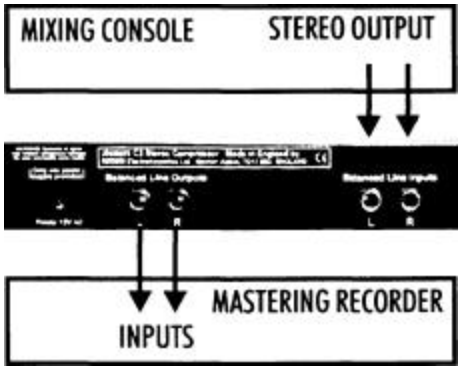
3) As a 'subgroup' compressor

When recording with a number of microphones it's often an advantage to create a separate mix of say drums, or guitars, and compress them together either as a mono or a stereo mix. The C2 is particularly suitable for this. The microphones are mixed as a subgroup in the mixer, then the subgroup output (often an auxiliary output) is connected to the input of the C2. The output of the C2 is connected back into an auxiliary input of the mixer.



4) As a mixdown compressor

This is possibly the most likely use for the C2. Connect the output of your mixer or soundcard to the input of the C2. Connect the output of the C2 to your mastering recorder. Listen to the compressed signal by monitoring the output of your mastering recorder.



MONO OPERATION

The Joemeek C2 compressor is designed primarily as a stereo compressor, but there is no reason why it cannot be used as a mono compressor. To use it in stereo, simply connect to the left and right stereo inputs and outputs. To use the C2 in MONO mode, connect the signal source to the left input and connect the output from the left output. When using the compressor in mono mode, operate the 'compression' control at or near maximum.

CAUTION! Do not attempt to use the C2 as two separate mono compressors. The results will be unpredictable because of the internal M&S coding and decoding circuits.

WHAT IS LIMITING AND COMPRESSION?

Why is the JOEMEEK different to a modern high tech. compressor limiter? It was designed as a stereo effects compressor rather than a 'leveling amplifier' as the early compressors were called. These are the basic definitions: 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.

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 thought it 'sensible' to combine the functions of compressor and limiter and to 'stonewall' any and all signals above a certain level. The musical effect is that (I know I'm over simplifying) VCA compressors sound 'muddy' and flat under heavy compression situations, while old compressors sound lively and retain sparkle. ITS HORSES FOR COURSES, a good VCA compressor limiter will do a good job making medium wave radio sound a bit louder and protecting a radio transmitter from exploding, but it is a poor tool for making a voice track stand out. The JOEMEEK C2 combines the 'softness' of the best tube compressors, with a new type of optical circuit that gives a varying compression ratio depending on the settings and the programme material.

THE C2 AS A LIMITER

Unlike other JOEMEEK Compressors, the C2 compression effect has been designed to turn into a limiter at extremes of input level. This limiting is useful as an effect but should not be relied upon to control the signal level to avoid distortion in the recording process. Being transparent to transients, the peaks of any program material may evade the C2 limiting effect. Pay careful attention to the volume levels within any recording system that comes after the C2. If overloads are occuring, turn down the output control of the C2 until the overloads are contained.

CONNECTIONS

Inputs and outputs are balanced, line level, and are designed to be operated either balanced or unbalanced modes.

CAUTION! When using unbalanced sources (sound cards, digital work stations, unbalanced output mixers) use conventional 2 pole jacks, ie; tip and sleeve. Only use 3 pole jacks for balanced operation.

OPERATION

- Connect inputs and outputs and plug in 12VAC power adapter provided.
- When the unit is powered, a green LED just to the right of the output volume control will be illuminated. When the 'compress' switch is pressed, a blue LED will light to indicate that compression is active; set compression to 'off' (switch out)
- Set the 'ATTACK' control to 4mS and the 'RELEASE' control to just above minimum.
- Set 'OUTPUT' control to minimum
- Feed some programme material into the unit and set the 'INPUT GAIN' so that the row of LEDs on the right hand side of the unit come alight up to the +4 level. This shows that there is sufficient signal in the C2 to compress.
- Set the output to match the equipment being driven. (professional studio equipment is normally +4 or 0dB. less expensive equipment is often -10dB) Vary this control so that there is the right amount of signal being fed to the equipment being driven.
- Press the 'Compress' switch so that the blue LED is alight and turn up the compression control until one or two of the yellow 'compression' LEDs start to light The compressor is now working.
- Adjust the attack, release and compression controls to get the effect required.

CONTROL EXPLANATIONS

There are two main gain controls on the compressor; the input gain control and the output gain control. The input gain control is a stereo ganged control that sets the audio gain of the front end amplifier. At maximum, the gain of the unit is about 26dB. This is more than adequate for compression and allows enough gain for the compressor to be driven by stereo musical instruments, keyboards and computer cards. If you set the gain to say 10dB and wind in compression until the ouput is is back at 'zero', you have 10dB true compression. The output gain preset control is to set the output to a comfortable level for the equipment it is feeding into.

CAUTION. The compressor has gain, and a high output capability. If you hear signs of overloading it's likely that your mixer insert point, or whatever you are feeding into is being overdriven it's very unlikely that you are overdriving the compressor: Try turning down the output volume.

'COMPRESSION' simply adds gain to the compression sidechain. 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 with programme content and amplitude. For practical purposes, winding up the compression control increases the amount of compression. In use you will find that musically, all controls are interrelated. It's recommended that the compression control is operated at or near maximum when heavy compression is needed.

'ATTACK' sets the time that the compressor takes to act. At minimum (fastest) it's 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 by using a drum track and setting the 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.

PROBLEMS

1) Got signal going through but no compression.

In/out switch? Is there enough volume level going in? Is your stereo signal in phase? (If it's mono, and exactly out of phase, the compressor will not work!).

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 on the original, 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 to drive your insert point or mixer input too hard. Try reducing the input gain control and winding up the compression a bit more. Or you can reduce the output 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. You could also try a longer release time to 'smooth out' pumping effects.

5) It won't pump hard enough!

Again, it takes practice getting the gain control in the right range. Set the attack to halfway, and release at minimum, then don't drive it too hard. Work the input gain and the compression controls until its right.

6) One side is louder than the other!

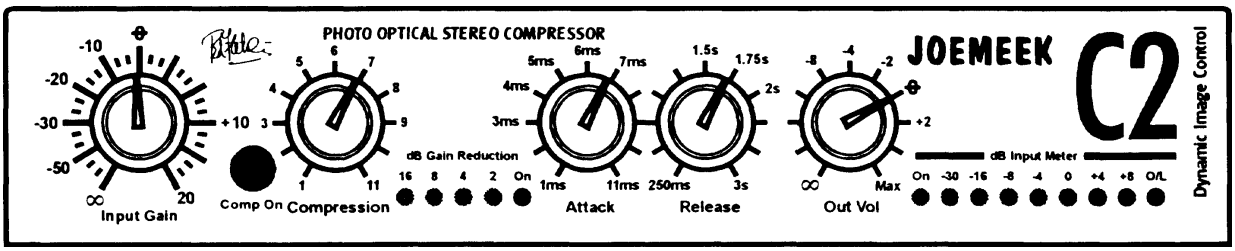
You have a wiring or plug problem! If you plug an input or an output with a bad connection on either the tip or the ring of the jack, then it will sound OK but be just low in volume. The MS coding system used in the compression circuits of the C2 makes level errors impossible.

TIPS ON USE

Whatever type of compression is needed, the most important control is the Input Gain. This sets the volume level into the compression circuits. If too little is fed to the compressor then compression sounds will be weak. DO NOT BE AFRAID TO DRIVE PLENTY OF INPUT. The VU level LEDs are designed to work up to the +8 point. When the 'overload' LED flashes on, this is a warning to go no louder; stay at that level!

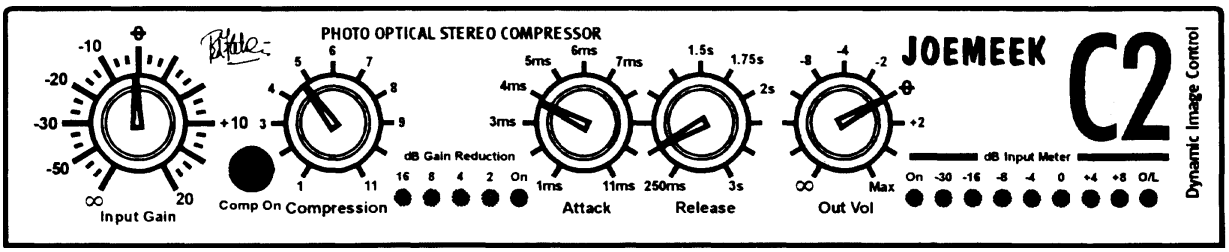
VOICES

The compressor adds stability and depth to solo voices Over compression with fast attack times on voice will change the apparent tonal quality so listen carefully! Try recording first with a little compression, then adding more at a different release time on the mix. A good starting point for solo voice compression is ; Attack 7mS, Release 1.7 secs. drive the compression so that only one yellow LED lights steadily.



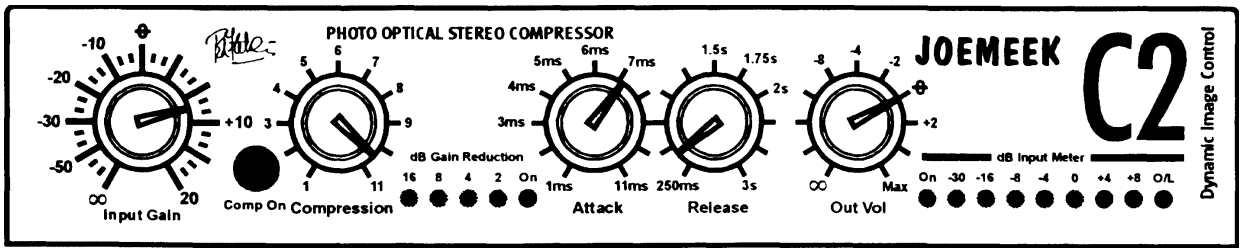
PIANO

Try setting attack at not less than 2mS and release at about 0.5secs to 1 sec. Tricky, use it very gently unless you want unusual effects! Keep the compression control low so that not more than 2 yellow LEDs light.



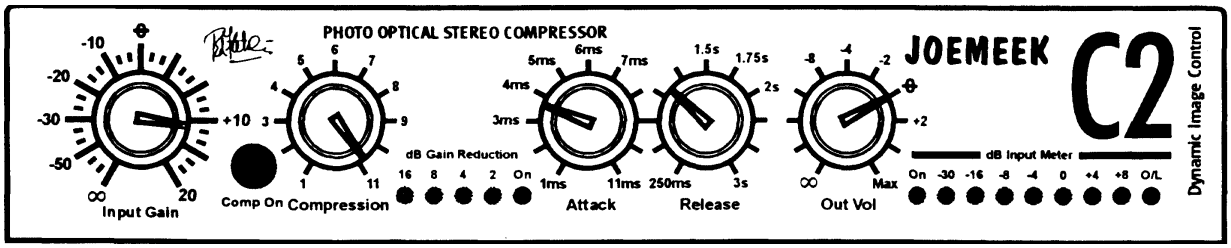
PERCUSSION

This compressor sounds so good that the danger is to use it too much too early, save heavy use for the mix. A heavy 'thwacky' drum sound can be achieved with Attack at 6 to 7mS and Release very close to minimum. For smoother sounds increase the release time. Don't be afraid to turn the compression control up full, and then increase the input gain if more compression is needed.



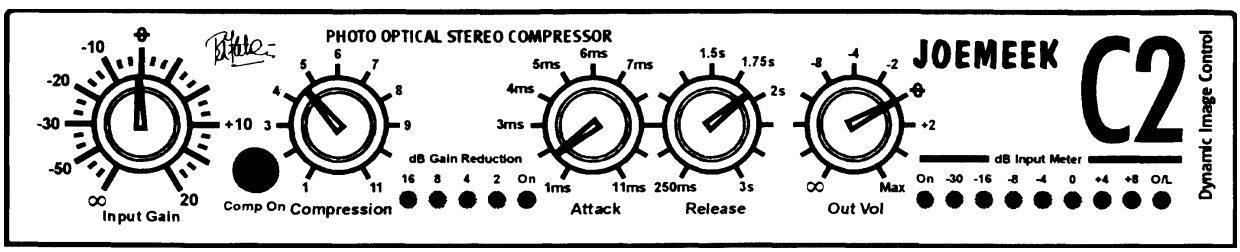
GUITARS

Wind it on! It's possible to get superb sustain effects from the compressor. Try using about 4mS attack and about 1sec release with the compression control at full. To increase the sustain, simply turn up the input control (to full if necessary).



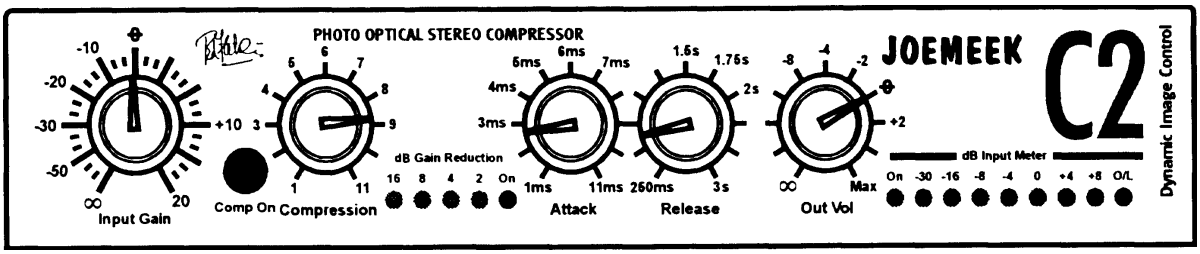
ORCHESTRAL

A little light 'tightening' of an orchestral sound will make it more present and warmer sounding and add body to string sounds. The Attack can be kept short; at or near minimum, with the release at about 1.7 secs. Be careful not to do too much!



SYNTH SOUNDS

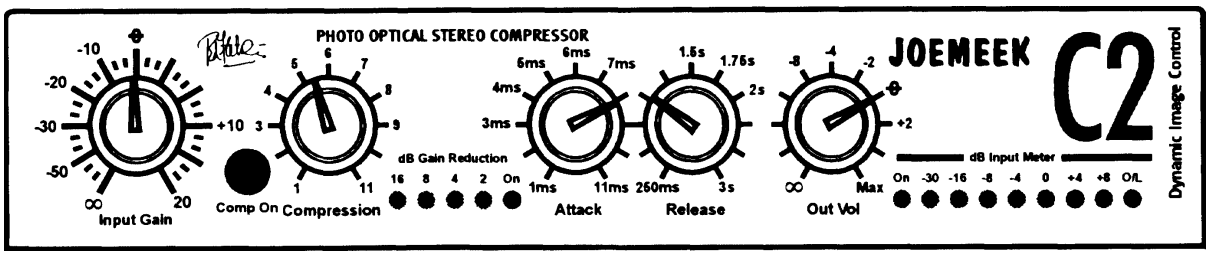
There cannot be a general rule with synth sounds. Organ types of sounds respond well to compression and can be treated with fast attack and fast release conpression to get punchy sounds. Sustained chordy sounds should be left almost uncompressed otherwise they can suffer from 'ripply' sounds.



SUBGROUPS

Remember that big compressed sounds are a balancing act; When heavy JOEMEEK type compression is being used on a complete mix, or on a group of instruments, if any instrument or sound in the mix is suddenly louder than others, it will kick down the level of all the rest. As the sound stays bright and 'present' with this compressor, it's possible to go much heavier than on any other compressor without the sound going muddy;

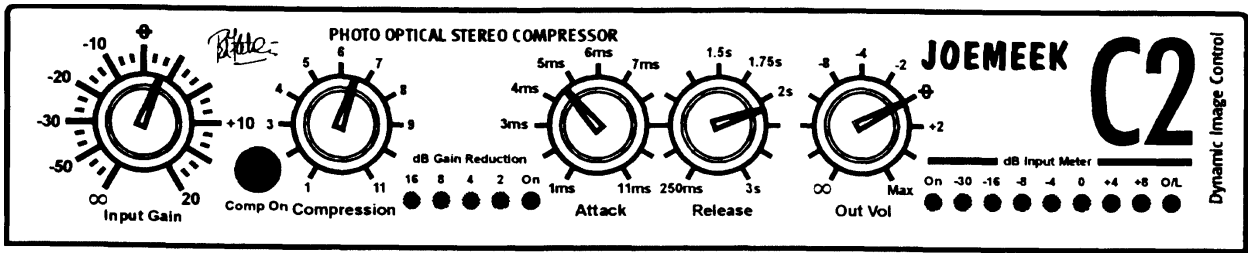
but the initial balance gets more critical! Experiment with the attack control. As a starting point set the Attack to 8 to 10mS and the release to about 1sec. This is a good general setting for rythmic pop music. Try compressing the backing but leave the bass outside the compression and compress it separately.



ON THE FINAL MIX

The JOEMEEK C2 is very suitable as a final mix compressor. Assemble the sounds and do several run throughs with the compressor in circuit but with the compression switched OUT. This allows you to get the overall levels right and avoids momentary overloads which could spoil the mix. Once the sound of the mix is as good as you can get, switch in the compression and experiment with depths and attack/release times. It's unlikely that you will need extremes of compression at this stage;
however, Joe Meek (the man himself) used to put up to 10dB of extra compression on at this stage!

GENERALLY, because the compressor is so extremely quiet and free of any nasty distortions, its quite OK to use it both on individual tracks, and on the mix, so I tend to use it individually on almost everything just to gain some individual warmth, then use it again on sub groups in the mix; so it pays to have more than one! TF



Ted Fletcter says:

"I set out to design a stereo compressor that is easy to use, but will give the sort of results that have made the name famous; all Joemeek equipment is fully balanced nowadays, so that was a must. The newly developed Joemeek Sum and Difference compression system is such an advance on the conventional L/R stereo compressor that I decided to incorporate it into the C2 from the word go, the stereo image stability and the accuracy of the left and right gains is a very real improvement over all other types of stereo compressor. While I was experimenting with the way the bigger Joemeek compressors work with different compression ratios, I developed a new design idea which makes the compression ratio vary with just the input gain control. The results are so good that you can get full control and the widest range of compression effects without a separate ratio control; even as far as making it into a limiter! In common with all the other Joemeek compressors, the compression varies with frequency and tonal content; it's got the Joemeek sound. The VC3 mounting all-metal case is based on tried and tested design. Already with its smart new metering and outstanding performance, the C2 looks like becoming not only a design milestone, but also the compressor that everybody has to have!"

TECHNICAL SPECIFICATION

INPUTS :	Standard jack precision balanced 40Kohm load impedance.
	Max input : +28dB
OUTPUTS	Standard jack precision balanced 60ohm source impedance.
	Max output: +28dB
SYSTEM GAIN :	26dB maximum, variable stereo input and output.
SYSTEM NOISE :	-90dB.
	Signal to noise ratio; 118dB
SYSTEM LINEARITY :	flat (-1dB) 8Hz to 30KHz.
	Harmonic distortion better than 0.01% except under compression at low frequency.

COMPRESSION : Photo-resistor compression with shaped compression ratio

starting at 2:1 and varying to 14:1 (limit). Compression acting within "sum and difference' mode eliminating image shift. Attack time variable from 1mS up to 11mS. Release time variable 250mS to 3secs. Compression metering 4 LEDs plus 'on'. Main signal metering 8 LEDs plus 'power on'.

COMPRESSION BY-PASS : switch introduces audio path gain

adjustment and instant muting of the compression sidechain so that true comparisons can be monitored.

SYSTEM DESCRIPTION

Stereo audio balanced signals are received by the dual 'superbal' input stages which provide ideal input conditions and minimise common mode interference. The input gain stages form a matrix which produces a 'sum and difference' pair of signals ('MS' stands for 'middle and side', the 'sum' signal carries the main or 'middle' information while the 'difference' signal is the 'side' or stereo positioning information) which are then compressed separately, but using the same sidechain. Compression metering is driven directly from this sidechain giving a reading of dB compression. Audio level metering is driven direct from the 'sum' signal after compression giving an accurate state of the total stereo level within the system in dBs. The compression attack time is continuously variable, as is the release time. Both the attack and release characteristics are non-linear and follow established curves which give the Joemeek compressor a unique sound. Compression by-pass is done by disabling both the sidechain and the optical cells, while at the same time reducing the system gain to compensate for compression. This gives a similar effect to a true 'hard wire' by-pass; but with the advantage of keeping any gain make-ups.

After compression, the Sum and Difference signals are reconverted back into conventional left and right with a second matrix which incorporates the output gain control. After the output gain stage, the left/right signals are fed to a pair of symetrical balanced output stages which give optimum drive conditions to balanced lines.

The use of the 'sum and difference' compression method eliminates any error in left/right level during compression as well as correcting for any electrical gain error in either the input or the output gain controls.

REGULATIONS AND SAFETY

The JOEMEEK Compressor has been designed and built to conform to all known safety requirements in the world. Within the European Union the Compressor 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 complies with UL requirements.

POWER

The JOEMEEK C2 and VC3 compressors and preamplifier supplied with a special AC adaptor which provides the correct AC power for the units to operate correctly and safely.

DO NOT ATTEMPT TO SUBSTITUTE A DIFFERENT POWER ADAPTOR OR THE UNIT WILL BE DAMAGED.

POWER EARTH (GROUND) CONNECTION

Because the C2 and the VC3 operate from low voltage AC adaptors, there is no direct connection from mains power ground to the chassis of the unit.

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.

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)

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"If it sounds right; it is right"

Joe Meek, 1964