Alice®
BROADCAST SOLUTIONS™

Alice 538T
Stereo Effects Compressor

User Handbook & Operating Notes
written by Ted Fletcher

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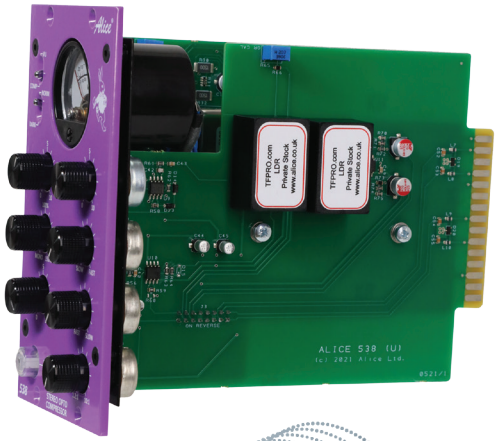
Stereo Effects Compressor
User Handbook and Operating Notes

The ultimate stereo effects compressor in compact 1U format.

- Ted Fletcher's historic opto compression design.
- Perfect 'Hard-Wired' by-pass for instant comparisons.
- Wide range ratios from gentle to brutal.
- Accurate VU and compression metering on illuminated meters.
- Extreme stereo width control.
- Accessible compression sidechain.



Limiting and Compression

Why is the ALICE 538T different to a modern high tech. compressor limiter or 'plug-in'?

The 538T has evolved 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 digital compressor/limiters where designers think it 'sensible' to combine the functions of compressor and limiter, keeping the ratio constant and to 'stonewall' any and all signals above a certain level.

Limiting and Compression *continued*

The musical effect is that (I know I'm over simplifying) both digital and VCA compressors sound muddy and flat, while old compressors sound urgent, lively and retain sparkle.

In common with the first JoeMeek SC2 compressors of the 1990s, the Alice 538T uses the apparent deficiencies of the older technology providing a powerful artistic tool for the creative engineer.

Joe Meek used to say to us in the studio, *"If it sounds right, it is right!"*

To his contemporaries he went way over the top with overloading the record electronics on his EMI and 'Lyrec' recorders, and swathing his less-than-perfect singers in bathroom echo and reverb, but his artistic use of non-linear compression was masterly.

The Alice 538T

For the ultimate in simplicity and economy, the 538T occupies a single space in a standard 19 inch rack.

Inputs and outputs are, of course, balanced line level but can be operated unbalanced without loss of quality.

The Controls

The LED on the left of the front panel illuminates whenever mains power is plugged into the unit.

The large 'ON' push-button switch is the 'ON/BY-PASS' switch; this controls the hard-wired by-pass relays. When the 538T is 'off' the audio signals go direct from input to output with no controls and nothing in the way. When the switch is pressed, the audio goes via the opto compressor and the 'comp on' lights.

- **Inputs** controls the Left and Right input into the compressor.
- **Comp** sets the volume at which compression starts.
- **Release** gives control of the time taken for the compressor to recover.
- **Normal/Dark Switch** artistically alters the release timing profile.
- **Attack** gives control of the time for the compressor to react to audio.
- **Ratio** sets the compression ratio at the normal operating level.
- **Output** sets the audio volume level of the compression output (after the VU meter).
- **VU/Comp Switch** alters the mode of the meter from normal VU volume reading (of the sum of L and R audio), to gain reduction reading showing the instantaneous compression effect.
- **Width** allows the engineer to set the level of stereo width, from 'mono' to 150% stereo. The 's' point shows where the stereo is at 100%.

First Operations

Feed some programme material into the L and R inputs and set the COMPRESS control to 0 and 'INPUT' control to about number 5; this will correspond to about 10dB gain. The VU meter (set to 'VU') should indicate audio. Adjust INPUT so that there is a good reading on the VU meter.

Set the 'output' at about 4. Set the meter switch to 'GR' (the meter needle will now sit at around the '0' point). Turn up the **COMPRESS** control slowly and, if there is enough audio signal, the meter will start to indicate compression by the needle moving downwards.

The compressor should now be working, and your ears can take over.

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 simple stereo ganged control that sets the audio gain of the front-end amplifier.

At maximum, the gain of the unit is about 20dB. So if you set the gain to say 10dB and wind in compression until the in/out switch tells you that the output is the same, you have 10dB true compression.

The output 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 other equipment or mixer insert point is being overdriven. it's very unlikely that you are overdriving the compressor: Try turning down the output.
- **'Ratio'** This control alters the ratio of compression. In practice, '1.5:1' is very gentle compression while '10:1' can give severe 'pumping' effects.

Control Explanations *continued*

- **'Compress'** 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.

- **'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 over-compress momentarily giving a tiny dip immediately following the start of the 'note'. This is best demonstrated by using a drum track and setting the ratio near 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.

Control Explanations *continued*

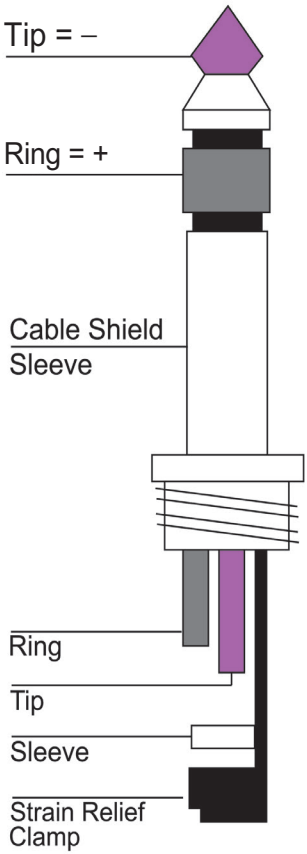
- **'Release'** sets the time during which the path gain returns to normal after compression. Generally, the longer the time, the less obvious is the compression.
- **'Width'** sets the level of audio information that tells us the width and depth of the stereo signal. At fully anti-clockwise, the stereo information is removed; the audio is mono.

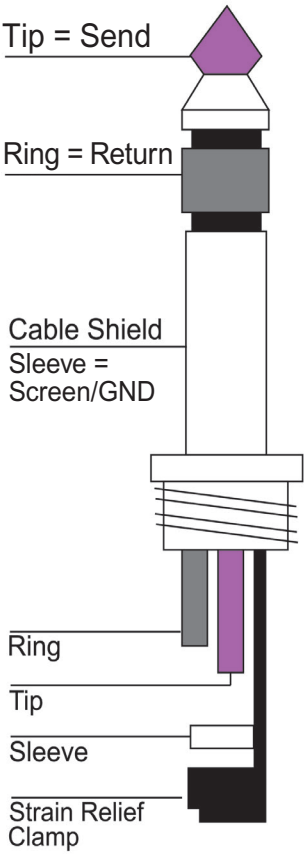
  At 100% the stereo information is proportionally the same as in the L/R input signal. When the control is moved further clockwise the effect is to 'widen' the stereo image and generally to increase the effect of echo and reverb.

Connectivity

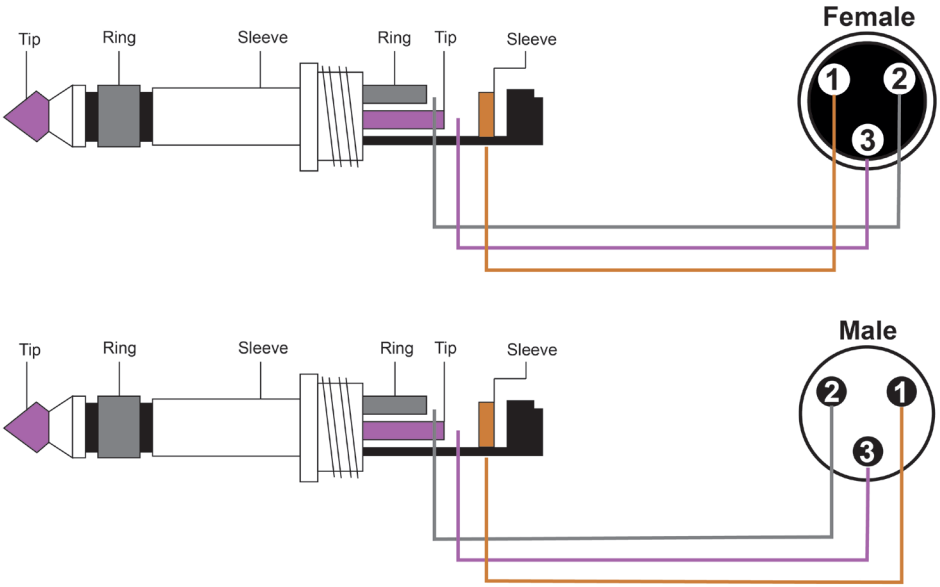
- xxxxxxxx
- xxxxxxx
- xxxxxxx

Connectivity *continued*





Connectivity *continued*

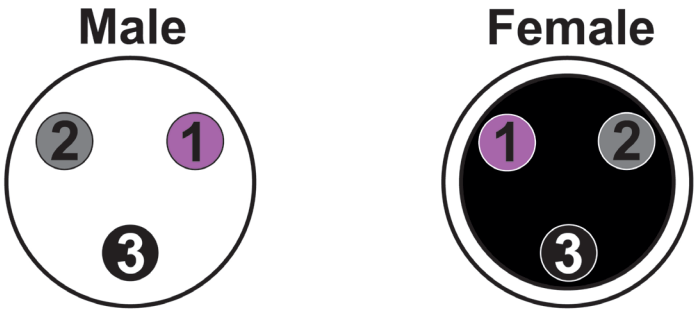


Connectivity *continued*

XLR Connector Pinout - Pin 2 Hot

Rear View

(The side with cup terminals for soldering)



PROBLEMS and FAQs

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 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 other equipment or insert point too hard. Try reducing the input gain control and winding up the compression a bit more.

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 compress control.

PROBLEMS and FAQs *continued*

5. It won't pump hard enough!

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

6. Can I use the 538T as two mono compressors?

The answer is no! The 538T, like the old SC2 was designed specifically as a stereo compressor, the sidechain is common to L and R, this, with its 'sum and difference' compression system eliminates problems with stereo image shifting; but it also means that if one of the inputs is phase reversed, the compression will not work.

7. Can I use the 538T as a mono compressor?

Yes, the 538T can be used as a mono compressor; just turn the width control to 'mono'.

The 538T Compressor; *What it does.*

Anyone who has tried to record a human voice in the simplest possible way has found that the dynamics of real world speech and music are impossible to handle with a 'linear' recorder: Even if the signals do not overload, the final result is a recording that seems to be thin, quiet and too wide in dynamic range.

Early analogue tape recorders had a built-in answer to the problem, slightly overloading the record channel produced (predominantly) 2nd order harmonic distortion and some volume compression. This made recordings sound 'warm' and reduced the problems of dynamics. Unfortunately, (?), modern recording mediums don't react that way; they produce an accurate reflection of the input with all its built-in problems.

Most thinking engineers know of these problems and correct with the use of equalizers (to change the psychoacoustic distance from the microphone), limiters (to reduce dynamic range at the louder end) and sometimes enhancers (to sparkle it up). And then find that it is extremely difficult and time consuming to get a warm and cosy sound.

The 538T Compressor; *What it does.*

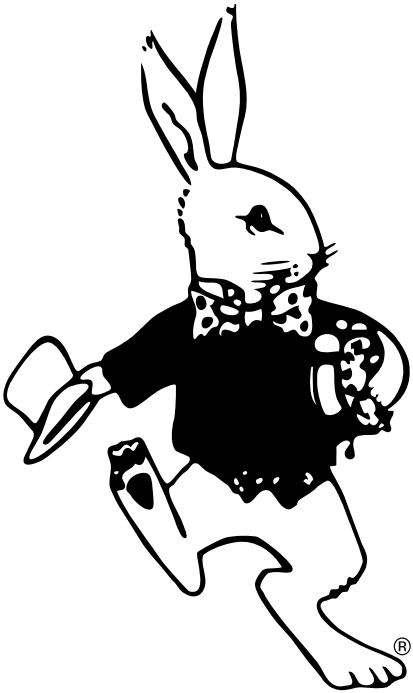
Joe Meek, in common with all engineers, experimented with the limited facilities of the time (1960 - 1965) and came up with a way of enhancing the 'tape bend' effect with compression. The compressor he used was primitive in the extreme, but coupled with the compression distortion provided by the valve tape machines he had, the result was voice and music sounds that were unique and sold records by the million.

Even first time around in the 1990s, I had to make some significant improvements in the way the early compressors worked to make my JoeMeek SC2 acceptable to engineers, but the SC2 rapidly got into general use in top studios all over the world, the consensus was that the sound was right, and really did recreate the warmth and power of the old equipment without the side effects.

There are now hundreds of types of compressor/limiters on sale in the world, all struggling for a place in the market with extra knobs and facilities and all missing the fundamental point;- that a successful modern compressor is there to produce a psychoacoustic effect of power and dynamics rather than to perform any protective function electronically; it's a creative tool.

The 538T Compressor; *What it does.*

The old original SC2 and now the new 538T recreate the dynamics of the old analogue tape and compressor combination. And yes; it is entirely possible that algorithms exist that can do the job, but are they as easy and quick to use?



Tips on use

Some handy hints from some world class users:

- **Voices.** The compressor adds stability and depth to solo voices, it allows you to use less EQ or 'enhancer' and still retain the sparkle. 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.
- **Piano.** Tricky, use it very gently unless you want unusual effects!
- **Percussion.** The danger is to use it too much too early, save heavy use for the mix.
- **Guitars.** Wind it on! The depth and sustain make it a must.
- **Orchestral.** A little light 'tightening' of an orchestral sound will make it more present and warmer sounding and add body to string sounds.
- **On the Mix.** Remember that big compressed sounds are a balancing act; 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; but the initial balance gets more critical! Experiment with the attack control.

Tips on use *continued*

- **Group Recording.** Try compressing the backing but leave the bass outside the compression and compress it separately.
- **Generally,** because the Alice 538T 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!

Technical Specifications

- **Inputs - XLR** 10K impedance transformer balanced.
- **Gain -** Maximum 24dB
- **Noise -** At least 80dB below operating level Dynamic range exceeds 100dB.
- **Harmonic Distortion -** Generally within 0.005%. 2nd order harmonic distortion rises at lower frequencies under compression.
- **Amplitude Frequency Response -** Line in 20Hz to 20KHz within 1dB.
- **Audio Crosstalk -** the 538T uses M/S processing (sum and difference) with 'side' content variable via the width control. With width set at 100% L/R crosstalk can be better than -50dB.
- **Output - XLR** Floating transformer balanced 100 ohm. Max balanced output approx. +26dBu.
- **Compressor -** Photoresistive servo operated feedback type - Ratio non-linear; minimum approx. 1.2 to 1 maximum approx. 10 to 1. Sidechain filtered for correct bass compression. Compression sidechain accessible via 1/4 inch jack socket on rear - 15VA.

  Attack time 1mS min. 10mS max. (variable) - Release time 200mS min 1.5S max. (variable).
- **By-Pass -** hard wired via relays.

Technical Specifications *continued*

- **Power -** Mains power 85VAC to 240VAC
- **Housing -** 1U standard 19 inch rack unit.

Ted Fletcher (revision March 2023)

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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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