

**REBIS AUDIO RA303
COMPRESSOR, LIMITER, EXPANDER, GATE
OPERATORS MANUAL**

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INTRODUCTION

The RA303 provides two compressor/limiter- /expander/gates in a standard 19" x 1.75" (482mm x 44mm) rack mounting unit which can be used independently or linked in stereo.

Each channel has three LED meters, output level, expansion level and gain reduction, and rotary controls for compressor threshold, compression ratio, compressor knee, compressor attack and release, expander threshold, expander ratio, expander release, output gain and limiter threshold.

In addition there are independent switches on each channel for bypass, compressor in/out, compressor auto/manual dynamics, expander in/out, expander auto/manual attack and clipper in/out, plus a stereo switch on the left channel.

The Compressor Threshold is variable down to -30dBm and the Gain control has a reserve gain of 30dB. The Compressor Ratio control provides continuously variable compression ratios from 50:1 (limit) to 1:1 (no compression). The compression slope range can be varied from 0 (hard) to 6 (soft) with the Knee control. The Compressor Attack time can be varied from 50µs to 20ms and the Compressor Release control has a range of 60ms to 2secs. The Expander Threshold is variable down to -40dBm and the Expander Ratio control provides expansion ratios from 25:1 to 1:1. The Expander Release has a range of 40ms to 2secs. The Limiter Threshold is variable over the range 0dBm to +20dBm.

INSTALLATION

Immediately the RA303 is unpacked it should be inspected for transit damage. The unit left the factory in perfect order and any damage should be reported to the carriers immediately.

Signal connections are made via the jack connectors on the rear panel. Both inputs and outputs can be electronically balanced as an option and if so should be wired with stereo jack plugs in the normal way. Note: Mono jack plugs must not be used for balanced outputs as these will short out one leg of the output possibly causing instability.

EARTHING

Some experimentation may be required to ascertain the best arrangement for earthing but the following is the system most commonly used. The rack in which the unit is mounted is connected to the system master earth point. Check that the unit's chassis makes good electrical contact with the rack. The screens of the input and output cables are discontinuous, the input screens connecting at the RA303, the output screens connecting at the system end. A separate wire is run from the signal earth of the unit to the system master earth point. Using this arrangement the mains earth at the end of the IEC lead should be left disconnected, the chassis of the unit being earthed via the rack. Whatever earthing system is used **IT IS ESSENTIAL THAT THE CHASSIS OF THE RA303 IS ULTIMATELY CONNECTED TO MAINS EARTH.**

POSITION

The unit should not be installed in close proximity to equipment such as power amplifiers or power supplies which produce heat or high levels of magnetic interference.

OPERATION

Compressor:

A compressor is a device which reduces the dynamic range of programme put through it. The compressor only normally acts on signals that are above the threshold level which is set on the front panel, see Knee section below.

Ratio

The Ratio control sets the relative dynamic range of the output to the input. Set to 1:1 the output is the same as the input, whilst at the other extreme, 50:1, the output is "limited". This means that the dynamic range is squashed such that a 50dB increase in input level only produces a 1dB change in output level.

Compression ratios around 2:1 will reduce the dynamic range of vocals and similar programme material without making them sound compressed. High compression ratios are useful for tightening up instruments such as bass, drums and rhythm guitar.

Knee

The Knee control on the RA303 sets the range of levels over which the compressor starts to act. When this is set to 0 (hard) then the RA303 reaches it's set compression ratio as soon as the signal level crosses the threshold level. However when the Knee is set to 6 (soft) the RA303 starts compressing at low ratios when the signal level reaches 20 dB below the threshold level and does not reach the ratio set with the Ratio control until the signal level is 20dB over the threshold level.

This provides a very natural sounding compression where the ratio varies automatically with the signal level, more compression being applied when the signal level rises.

Even with large values of Knee range the output never rises to a higher level than it would reach at low Knee values.

Attack

The Attack control sets the time between the signal wavefront exceeding the threshold level and the compressor acting. Therefore drums, vibes and other instruments when played percussively would need a fast attack to capture the input transients.

However very fast attack with a bass guitar will produce a click due to clipping of the low frequency waveform. Longer attack times will obviously let through varying amounts of the input envelope.

Release

The Release control sets the time between the signal dropping below threshold and the compressor ceasing to act. Release time settings depend on the amount of compression and the type of programme.

Percussive instruments usually require short release times so that the compressor recovers almost immediately and the increase in background noise is unnoticeable. If a long release were used background noise would be heard rising in the gaps.

Long Release times maintain the dynamic range of full programme material whilst controlling it's overall level. the compressor is driven by the peaks in the music and does not release in between them, therefore everything is compressed by the same amount and the dynamic range is preserved. Note that the success of this technique is dependent on the type of programme.

Auto Dynamics

Pushing the DYN AUTO/MAN button on the front panel switches out the Attack and Release controls and selects a system which automatically sets the attack and release times to their optimum settings for any particular type of signal as described above.

Gain

The Gain control is simply used to obtain the required output level.

OPERATION Compressor: (Cont)

To help familiarise yourself with the effects produced by the various controls we suggest the following procedure. Put programme through the compressor and set the Ratio control to 50:1. Turn up the Threshold control until the meter indicates peaks of about 10dB of compression.

Now adjust the output control until the input and output levels are similar. By turning the Attack, Release, Knee and Ratio controls and listening to the effects produced the best settings for different types of programme material can be found.

OPERATION Expander/Gate:

The Expander/Gate section of the RA303 can be set with the Ratio control to act either as a noise gate to remove any background noise which may have been amplified by the action of the compressor section or as a dynamic level expander to add extra 'punch' to over compressed 'dead' recordings.

Noise Gate

For operation as a noise gate the Ratio should be set to 25:1 and the Threshold adjusted so that the expander just closes down when only background noise is present.

The Release control should be set to give the most natural sound as the gate closes, this is usually short release times for percussive events and longer release times for any other type of signal. The ideal setting is best found by experimentation.

The Attack time of the expander can be left fixed at 2mS for the majority of signals. The Auto attack position is mainly used for percussive signals like drums where the attack time needs to be faster on the required signal, but background interference not very far below this needs to be suppressed. The Auto setting adjusts the attack time with reference to the signal level above threshold.

Frequency Related Gating

In some situations where there is very little difference between the levels of the track and the unwanted signal gating is still possible, provided there is a consistent difference in the frequency content of the two components. An equaliser in the main signal path cannot always solve this problem as filtering out the unwanted sound will sometimes affect the desired signal. However an equaliser can be used to separate the two signals if it is used in the side chain of the expander. The RA303 is equipped with side chain inputs on the rear panel into which an equalised version of the main signal can be inserted to achieve this. The unwanted signal is filtered out of the side chain input with the equaliser and so the expander cannot open on this signal.

Expander

For use as an expander the Ratio should be set to approximately 2:1 and the Threshold control set to give about 10dBs of expansion at the peaks of the signal in order to ensure that all of the dynamic range of the signal is expanded. The Gain control is adjusted to give the required output level as with the compressor section. The Release control is normally set to relatively long times when in this mode to remove any unpleasant audible effects which can be created by manipulating a signal in this way.

STEREO LINK

When the stereo link is switched in the control signals of the compressors are mixed and fed into the left channel controls, the output of which is then fed to both VCAs. Therefore a peak on either channel will compress both equally. This means that the stereo image is maintained. When used in this way most of the controls and meters of the right channel are not used and have no effect.

The only controls on the right channel which still work when in Stereo mode are the Gain and Limiter Threshold since these circuits are still independent.

Voice Over

The stereo link in conjunction with the side chain inputs on the rear panel can be used for the fading of one signal (even a stereo signal) by another.

This technique is used for 'voice over' in broadcasting and for special effects. The controlling signal is fed to either side chain input and a dummy jack plug inserted into the other. The Stereo button is pushed, the left channel controls are set to give the correct sound and the left Threshold control is turned until the required amount of compression is shown on the meter when the controlling signal is present. (usually 6-10 dBs)

GUARANTEE

The RA303 compressor-limiter is guaranteed against defects in workmanship or components for a period of one year from the date of purchase, this guarantee applying only to the original purchaser. Should a fault develop within this period the unit will be repaired with no charge for parts or labour, shipping costs being met by the owner.

Any claim under the guarantee must be accompanied by a copy of the original customer invoice showing the date of purchase and the serial number. Any misuse of or modifications to the unit will render the guarantee void.

SHIPPING

NEVER RETURN A UNIT WITHOUT FIRST PHONING OR WRITING.

Should it prove necessary to return a unit it should be re-packed in the original packing material.

If this is not available it should be packed first in a plastic bag and then in a stout carton surrounded by at least 1.5" of shock absorbing material, Pelspan polystyrene chips, bubble pack blanket or foam chips are suitable. Make sure the packing is firm enough to prevent the unit from shifting in transit. Seal the carton with wide reinforced tape.

The carton should be marked **FRAGILE. DELICATE INSTRUMENTS.**

SPECIFICATIONS

Compressor Threshold: +20dBm to -30dBm.

Compressor Ratio: 1:1 to 50:1.

Knee: 1dB (hard) to 40dB (soft).

Attack: 50µs to 20ms for 90% capture.

Compressor Release: 60ms to 2Secs for 90% recovery.

Expander Threshold: +20dBm to -40dBm.

Expander Ratio: 1:1 to 25:1.

Expander Release: 40ms to 2Secs for 90% recovery.

Gain: -10dB to +30dB.

Limiter Threshold: 0dBm to +20dBm.

Metering: Three LED meters indicate output level, expansion level and gain reduction.

Dyn Auto/Man switch: Removes the Attack and Release controls from the compressor section and provides automatic control of these parameters.

Atk Auto/2ms switch: Provides an automatic attack system for the expander section.

Bypass: Each channel has an overall Bypass switch and separate In/Out switches for the expander and compressor sections.

Stereo Link: A switch links both channels in a Master/Slave configuration for preservation of stereo image or voice over. Stereo tracking within 1 dB.

Maximum compression: 40dB.

Maximum expansion: 85dB.

Maximum input level: +28dBm balanced, +22dBm unbalanced.

Maximum output level: +27dBm balanced, +21dBm unbalanced into 600 ohms.

Input impedance: 100 Kilohms per leg.

Output impedance: less than 50 ohms per leg.

Noise: Better than -94dBm.

Distortion: Less than 0.1% THD with 20dBs of compression, Release set to 2 Secs.

Frequency response: + 1dB from 20Hz to 20KHz.

Power Requirements: 220-240V AC. 30 Watts Max.

(110-120V by internal connections)

Dimensions: 19" rackmount x 1U(44mm) x 245mm. Weight: 8 lbs (3.6Kgs) approx.