

TABLE OF CONTENTS

	Page
Introduction	2
Before You Start	3
Set Up	
Connections	4
Controls	4
Features	
Gate	5
Filter	6
Compressor	6-8
Input	6
Attack	6
Release	6
Ratio	6
Output	7
Gate In	7
S/C	7
Output	7
Link	8
Power	8
Operation Tips	
Gating	9
Filters	9
External Key	10
Compression	10-11
Dual Operation	12
Specification	
LA 4x4 Specifications	13
Suggested Set-Ups	
5 suggested applications & jack configuration	14-18

INTRODUCTION

LA AUDIO 4-CHANNEL DYNAMIC SIGNAL PROCESSOR

The LA Audio 4-Channel Dynamic Signal Processor is a dual-channel processor comprising two compressors and two gates which may be configured as either gated compressors or as independent compressors and gates. A two-band side-chain filter is also included and this may be assigned to either the gate or the compressor as required.

When used in the gate side-chain, the filter can be used to implement frequency dependent gating allowing spurious signals occupying different parts of the audio spectrum to the wanted signal to be attenuated, thus reducing the risk of false triggering. When assigned to the compressor side-chain, frequency-conscious treatments such as de-essing or de-popping may be accomplished. External gate key and compressor side-chain access is provided.

Both the gate and compressor utilise LA Audio's proprietary FET technology which more closely emulates the way vintage tube designs behave than more conventional VCA based designs. The compressor has a soft-knee characteristic which helps maintain a warm, detailed sound, yet the Ratio control of a conventional hard-knee has been retained to allow the user maximum control over the compressor action. High quality analogue circuitry is used throughout which minimises group-delay and offers a dynamic range significantly better than 16-bit digital systems while still providing plenty of opening headroom.

IMPORTANT INFORMATION

The mains lead connections to the appliance are coloured in accordance with the following code:

Green-and-Yellow.....**Earth**

Blue.....**Neutral**

Brown.....**Live**

As the colours of the wires in the mains lead of this appliance may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.

The wire which is coloured green-and-yellow must be connected to the terminal in the plug which is marked with the letter E, or by the earth symbol  or coloured green or green-and-yellow.

The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black.

The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

If the socket outlets in the home are not suitable for the plug supplied with this appliance, it should be cut off and an appropriate three pin plug fitted.

Note: The plug severed from the mains lead must be destroyed, as a plug with bared flexible cord is hazardous if engaged in a live socket outlet.

Use a 5A fuse approved by ASTA to BS 1362, i.e. carries the  mark.

Always replace the fuse cover, never use the plug with the fuse cover omitted.

WARNING - THIS APPLIANCE MUST BE EARTHED

CONNECTIONS

All audio connections are on standard quarter-inch jacks wired for unbalanced operation. The operating level is optimised for use with -10dBv systems but has sufficient headroom to operate comfortably in pro-audio environments where the +4dBu operating level is the norm. Each channel has separate input and output sockets for the gate and compressor, the gate is fitted with an external Key input while the compressor has side-chain access on a stereo jack wired Ring-Send, Tip-Return.

Power is provided via a standard IEC main socket and the working voltage may be selected for either 220v or 110v, 50-60Hz operation via transformer taps inside the unit. The mains fuse is on the rear panel and should be fitted with a 50mA fuse for 240v operation or a 100mA fuse for 110v operation. Note: this unit must be earthed.

CONTROLS

The gate and compressor making up each channel may used independently or together, in the latter case the gate comes before the compressor in the signal path. If used together, the compressor input socket is still operational which makes it possible to mix an additional live signal with the signal passing from the gate to the compressor.

The gate is a highly sophisticated design with built-in hold time and hysteresis to eliminate chattering and distortion when fast release times are used. It has two modes of operation: Fast and Auto. The Fast mode has a very fast attack time suitable for use with percussive sounds while Auto continuously adapts the gate attack time to the transient characteristics of the input signal. This not only simplifies setting up but eliminates clicks and glitches when slow attack sounds are being treated.

GATE

Threshold: Varies the gate threshold over the range -54dB to +20dB. A green LED indicates that the input signal has exceeded the threshold.

Release: Sets the time for the gate to close once the input signal has fallen below the threshold level. This may be set from 5ms to 4s.

Range: Sets the amount of attenuation when the gate is closed. This may be set to a maximum of 80dB, but for occasions where the background sounds merely need to be made less obtrusive rather than being gated out completely, the attenuation may be varied continually over the range 0dB - 80dB.

Ex-key: Normally the gate is triggered by the signal present at the input, but by selecting Ex-key and selecting a different line-level signal to the External Key input, one signal may be gated by another. For example, a sustained keyboard line at the input could be 'chopped up' in a rhythmic way by applying, for example, the output of a drum machine at the key input.

Listen: Routes the input from the gate's side chain to the gate's audio output. If an external trigger source is being used, it may be checked using the Listen button, and if the Filter is assigned to the gate side-chain, then the effect of the filter will also be heard. If the Ex-Key function is not being used, then the Listen function will present the input signal at the gate's output, again showing the effects of the Filter if assigned.

Auto: When this button is out, the gate operates in fast mode for use with percussive sounds. When Auto is selected, the attack time becomes programme-dependent. This is useful when treating signals with changing attack dynamics such as vocals. Normally the Auto mode will be used for all sounds except percussive ones.

Bypass: Switches the gate out of circuit.

FILTER

The filter comprises two independent, variable frequency shelving filters, each with a 12dB per octave response. The Lo filter has a high-pass response while the Hi filter has a low-pass response.

Gate/Comp Switch: Switches the Filter into either the gate or compressor side-chain. If the filter is not required in either, the Lo control should be set fully anticlockwise and the Hi Filter control Fully clockwise.

Lo Filter: Variable from 25Hz to 4kHz.

Hi Filter: Variable from 250Hz to 30kHz.

COMPRESSOR

Input: Controls the level of the incoming signal relative to the threshold at which compression takes place. The higher the setting, the lower the signal level at which compression occurs.

Attack: Determines the time the compressor takes to respond to a signal exceeding the threshold. Fast attacks bring the level under control virtually instantaneously while longer attack times allow the transient sounds through unchecked. Slower attack times are, therefore, useful for enhancing the attack of a sound such as a drum or bass guitar. The attack range is 20ms to 20ms.

Release: Determines how long the compressor takes to restore normal gain after the input signal has fallen below the threshold. If the release time is set too fast, the compressor may change gain too quickly giving rise to a pumping sound. Conversely, if the release time is too long, following sounds may be pushed down to a lower level than is desirable. A useful starting point for most applications is around 0.5s. The release range is from 20ms to 4s.

COMPRESSOR

Ratio: Determines the amount of gain reduction taking place once the input has exceeded the threshold. Unlike a hard-knee compressor however, the compression ratio increases progressively until it reaches the maximum as set by the user. This soft knee operates over an input level range of around 10dB. The Ratio may be varied from 1:1 to 20:1. At the 20:1 setting, a 20dB increase in input level will result only in a 1dB increase in output level, and so forth.

Output: Provides variable gain to restore the output signal level to compensate for the settings of the Input gain and Ratio controls. This should be set so that the required level is fed to the device the compressor is patched into.

Gate In: Links the output of the gate to the input of the compressor. The compressor input socket is still operational allowing simple mixing tasks to be carried out. When this switch is out, the gate and compressor operate independently and may be used to process entirely different signals.

S/C: Normally the compressor is triggered by the signal present at the input, but by selecting S/C and connecting a different line-level signal to the side-chain input, the gain of one signal may be modified by the envelope of another. This is known as ducking and is often used to allow a voice-over to automatically reduce the level of background music. In this case, the voice signal is applied at the S/C input and the background music signal at the input.

The amount of gain reduction depends on the Input and Ratio settings and is best arrived at by experiment. The Attack control sets how quickly the background music falls in level when the voice is present while the Release control sets how quickly it rises in level again once the voice has ended.

FEATURES

COMPRESSOR

Bypass: Disables the compressors gain control circuitry but leaves the Input and Output gain controls functional.

Link: Links the two channels for stereo operation. Ideally, the two sets of channel controls should be set as nearly identically as possible. When linked, the compressors track together based on the average settings between the controls on the two channels. This prevents one side of a stereo mix being compressed more than the other which would cause the stereo image to appear to move from side to side.

When the two compressors take their inputs from the gate outputs, and linking is on, then the gate triggers are also linked. This allows both gates to be triggered when a trigger occurs on either channel A and/or channel B. The Release and Range of each channel can still be independently adjusted to allow imaging effects to be setup.

Power: Main power switch.

Gain Reduction Meters: Each compressor has a 9-section LED meter which indicates the amount of gain reduction taking place over the range 0 to 16dB. In most applications, a gain reduction reading of between 8 and 12dB is normal. The more the Input control is turned up, the more gain reduction will be applied unless the Ratio control is set to 1 in which case the compressor will not operate. The higher the Ratio setting, the more gain reduction will be applied once the input signal has exceeded the threshold.

OPERATIONAL TIPS

GATING

For recording applications, gating is best applied after recording, assuming that the signals to be treated are recorded on separate tracks. Working this way has the double advantage that tape noise is also gated out, and if the gate settings are less than optimum, all that needs to be done is to reset the gate controls and run the tape again. By contrast, gating live sounds or sounds being recorded to tape requires very careful setting up as mistakes made here can't be recovered. For percussive material, always select the Fast mode of operation (Auto Out) and use Auto for everything else. In some circumstances, the result will be better if the Range control is set to, say, -10dB rather than on maximum. This will allow an attenuated version of the background sound to be heard when the gate is closed and can help create a more natural effect. An example of this might be an interview recorded on a busy street. Using the Range control to bring the traffic noise down to a manageable level will invariably sound more comfortable than removing it altogether.

FILTERS

If the gate 'false triggers' because of sound leakage from another source, the side-chain filters can help greatly. Perhaps the best example is the drum kit where a snare mic may also pick up some of the bass drum and some of the hi-hats. By switching in the filters and then pressing Listen, the filters can be set so as to reject as much of the bass drum and hi-hat sound as possible while still allowing the snare sound to pass through. Once the filters are set, the Listen switch may be released. The filters will not affect the sound of the signal being gated but will affect the way in which the gate responds; by reducing the level of potentially troublesome sounds, the gate will be less prone to false triggering and the threshold setting will be less critical.

OPERATIONAL TIPS

EXTERNAL KEY

The External Key facility provides access to a very powerful production technique whereby one signal is used to gate another. A simple example might be where a pad keyboard part fed into the main input and a regular drum beat into the Key input. Once the threshold is set to respond to the key input, the pad keyboard part will be chopped into short bursts in time with the drum beat. Feeding longer pulses of sound into the Key input allows for more precise rhythmic chopping, and virtually any sound with a fast attack and fast release will do, for example, a staccato organ sound played from a sequencer. The Range control may be brought into play to allow some of the pad sound through at a low level when the gate is closed; this will create an accent-like effect when the gate is triggered.

COMPRESSION

Many sounds benefit from compression as it creates a more even dynamic and enables sounds to coexist more comfortably in a mix. The soft-knee compression system of the 4x4 helps maintain a natural transparency to the sound being treated, and for most general purpose material, including vocals, an initial setting of 1m5 attack and 0.58 release is usually appropriate. Longer attack times, up to 50m5, may be used to enhance the transient attack of sounds such as guitar, bass or percussion.

OPERATIONAL TIPS

COMPRESSION

The higher the Ratio setting, the more firm the level control becomes once the input signal has exceeded the threshold setting. For most material, a setting of between 5 and 10:1 is appropriate. Very high Ratios effectively prevent the output from ever exceeding the threshold level and this type of compression is known as limiting. Limiting is useful as a form of protection in order to prevent the next piece of equipment in the signal path from being overdriven during loud passages. Limiting may be used to prevent DAT machines from being driven into distortion or to prevent power amplifier overload in live sound systems.

To reduce sibilance, the *de-esser* may be configured as a *de-esser* by switching the filters into the compressor signal path. Initially, the filters must be set up while switched into the gate signal path in order to provide access to the Listen facility. The main aim here is to adjust the filters so that they focus in on the sibilant S and T sounds of a vocal track while filtering out everything else. Sibilant sounds usually lie between 4 and 10kHz depending on the singer.

Once the sibilant sounds have been 'tuned in', the filter may be switched back to the compressor signal path. Because the filters are set to exaggerate sibilant sounds, the maximum compression will occur at times of maximum sibilance. This helps reduce the annoying effect of sibilance but the threshold control needs to be set carefully so that the treatment is not overdone. Too much de-essing can cause a dulling of the sound and may be more annoying than the sibilance it is trying to cure. If this happens, increase the threshold setting until the desired compromise is achieved.

OPERATIONAL TIPS

DUAL OPERATION

Because compression has the effect of increasing the level of quieter sounds, high levels of compression tend to emphasise noise such as tape hiss during pauses in the wanted material. In such circumstances, using the gate and compressor together can greatly improve the signal quality by ensuring that pauses remain silent. The gate should be set up first, with the compressor bypassed; once the gate is operating reliably, the compressor may be switched in and set up normally.

SPECIFICATIONS

LA 4x4 SPECIFICATION

GATE

MAX INPUT LEVEL	+22dBm unbalanced
INPUT IMPEDANCE	50k ohms
THD	0.02% at 10kHz
SIGNAL TO NOISE	95dB (4 channel closed) -95dB (4 channel open) Bandwidth 100Hz to 6000Hz +/- 1dB
EXTERNAL KEY	+22dBm unbalanced
THRESHOLD	-54dB to +20dB
SYSTEMS	12dB
ATTACK TIME	Auto-off, 3ms Auto-On, 20ms to 30ms depending on trigger signal.
HOLD / RELEASE	60ms / 4ms to 4 seconds
RANGE	0dB to 90dB

FILTER

HF FILTER	12dB/oct slope, 50Hz to 56Hz +/- 3dB
LF FILTER	12dB/oct slope, 200Hz to 800Hz +/- 3dB

COMPRESSION

MAX INPUT LEVEL	+10dBm unbalanced
INPUT IMPEDANCE	50k ohms
INPUT CONTROL	+10dB to 0dB range
MAX THRU GAIN	+50dB with compression off
OUTPUT TYPE	Fully adjustable, Unbalanced
MAX OUTPUT LEVEL	+22dBm +17.5dB at 20:1 compression
BANDWIDTH	100Hz to 6000Hz +/- 1dB
SIGNAL TO NOISE	85dB
DISTORTION	0.07% with no-compression
SIDECHAIN THRESHOLD	0dB
ATTACK TIME	20ms to 20ms for 100% recovery
RELEASE TIME	40ms to 4 seconds for 95% recovery
RATIO	Fully adjustable from 1:1 to 20:1
KNEE	Soft Knee - depends on threshold setting, ie input level
GAIN REDUCTION METER	9 segment led bar type in 2dB steps.

PHYSICAL

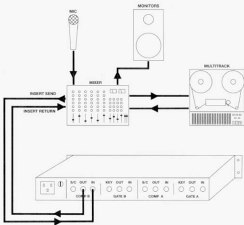
POWER SWITCH	Front panel push switch
MAINS INLET	IEC type, 240VAC, internally selectable with link
POWER CONSUMPTION	7 Watts
FUSE	Rear panel 20mm 100mA slow-blow
DIMENSIONS / WEIGHT	40mm H, 480mm W, 170mm D / 5kg



SUGGESTED SET-UP

BASIC CONNECTION FOR COMPRESSION

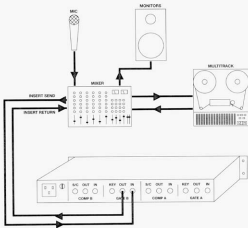
Utilising the 4x1 for a basic compression job. Recommended for recording applications.



SUGGESTED SET-UP

BASIC CONNECTION FOR GATING

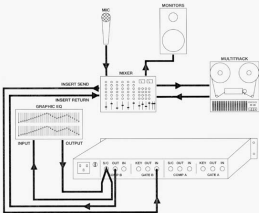
Utilising the 4x4 for a basic compression job. (Recommended for recording applications.)



SUGGESTED SET-UP

FREQUENCY CONSCIOUS COMPRESSION

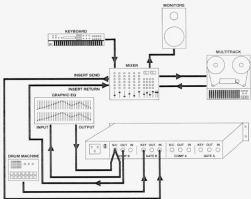
Connections for using external filter in sidechain of *iso* for frequency conscious compression/gating.



SUGGESTED SET-UP

CONNECTING EXTERNAL PROCESSORS

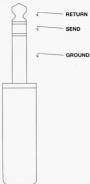
| Example of using 4x4 for triggering a gate by a drum machine.



JACK CONFIGURATION

PIN CONFIGURATIONS

SIDECHAIN



INPUT / OUTPUT AND KEY INPUT

