

CN-220

COMPRESSOR/NOISE GATE

OWNERS MANUAL



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1. INTRODUCTION

Congratulations on your purchase of the **ALTAIR** compressor/noise gate **CN-220**. Our dilated experience in the design and manufacture of effect processing equipment, had led to us to carry out this compressor/noise gate of great performances.

There is a lot the characteristics that make of the **ALTAIR CN-220**, one of the most highlighted of the audio professional market, here enumerated some:

- The **ALTAIR CN-220** incorporates in a compact unit, a Dual Compressor-Limiter with a full-featured Noise Gate front end.
- Dedicated filters are provided in the Gate section to Trigger the gate, only by the desired instrument, avoiding false gating. Test monitoring of the filtered signal is available to set-up the gate effect. Front panel Attack and Release time parameters are provided for optimal sound reconstruction or special effects creations. Background stage noises are easily removed without signal degradation, enhancing instrument control and mixing operation.
- Special attention has been taken to provide the professionals with a general purpose device. Specs such as +24 dBu (max) Input/Output level operation and extremely low output noise guarantee a broad range of audio industry applications.
- Additional features include a Band Compressor mode with adjustable frequency selection to achieve a variety of effects as De-Essing, Vocal Stopping, Drum Levelling, etc by compressing only the desired band without altering the whole audio spectrum. Electric Bass guitar sounds, for example, become more natural as the harmonic contents are unaltered when "Slap Bass" playing.
- Full specs, full features take the Altair CN-220 a step further in Audio Dynamic Processing.

Naturally, you want to use your compressor/noise gate, but before beginning is important that you read this manual. This manual will help you to install and use your new compressor/noise gate. It is very important that you read it carefully, mainly the paragraphs marked as NOTE, PRECAUTION and DANGER, for your security.

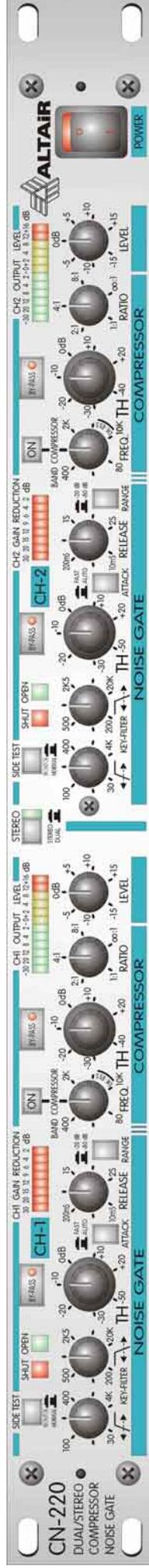
Save the original packing, you can re-use it to transport the unit. **NEVER SHIP THE ALTAIR CN-220 WITHOUT IT'S ORIGINAL PACKING.**



2. SWITCHES, CONTROLS, ADJUSTMENTS AND CONNECTORS

These are the switches, controls, adjustments and connectors that you could find in your ALTAIR compressor/noise gate. The description and explanation of each one of them, you will find in the corresponding section.

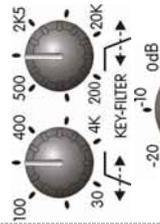
FRONT PANEL



SIDE TEST



SHUT OPEN



HP AND LP KEY FILTER CONTROLS.

NOISE GATE SECTION



THRESHOLD CONTROL.

FAST AUTO



ATTACK

RELEASE

ATTACK TIME SWITCH.

200ms 15

10ms 25

RANGE

RELEASE TIME CONTROL.

RANGE SWITCH.



BYPASS SWITCH.

COMPRESSOR SECTION

BAND COMPRESSOR



80 FREQ. 10K

TH -40

0dB +10 +20

BAND COMPRESSOR CONTROL AND SWITCH.

THRESHOLD CONTROL.



BYPASS SWITCH.

COMPRESSION RATIO CONTROL.

2:1 8:1 00:1

1:1

RATIO

GAIN REDUCTION

30 20 15 12 9 6 4 2 dB

COMPRESSION RATIO CONTROL.

GAIN REDUCTION VU-METER.



OUTPUT LEVEL CONTROL.

POWER SWITCH.

OUTPUT LEVEL

-30 -20 12 8 4 2 -0 +2 4 8 12 +16

OUTPUT LEVEL VU-METER.

STEREO

STEREO DUAL

STEREO/DUAL SWITCH.



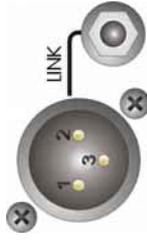
REAR PANEL



MAINS CONNECTOR, FUSE HOLDER AND VOLTAGE SELECTOR.



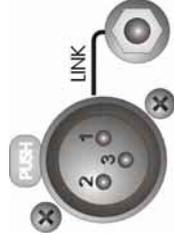
EARTH LINK SWITCH.



OUTPUT SIGNAL CONNECTORS, XLR-3-32 AND JACK 1/4" .



SIDE CHAIN CONNECTOR, JACK 1/4" .



INPUT SIGNAL CONNECTORS, XLR-3-31 AND JACK 1/4" .

3. WORKING PRECAUTIONS

- The manufacturer is not responsible of any damage occurred in the compressor/noise gate unit outside the limits of the warranty or those produced by not keeping in mind the working precautions.
- Mains voltage must be correct and the same as that setting on the rear of the unit voltage switch. Damage caused by connection to improper AC voltage is not covered by any warranty.
- **DANGER:** *Inside the unit there are high voltages, doesn't open it. The unit doesn't contain elements that could be repaired by the user. Whenever the compressor/noise gate unit is connected to the mains, contains elements with high voltages. In order to disconnect the unit completely, you must disconnect it of the mains.*
- **CAUTION:** *Protect the compressor/noise gate from the rain and moisture. Ensure that no objects or liquids enter it. If liquid is spilled into the unit, disconnect it from the mains and consult a qualified service technician.*
- Don't place the unit close to heat sources.



4. INSTALLATION

UNPACKING

Before leaving from factory, each compressor/noise gate was carefully inspected and tested. Unpack and inspect the unit for any damage that may have occurred during shipment. If any damage is found, doesn't connect the unit to the mains, notify the salesperson immediately, because a qualified service technician must inspect the unit.

Save the original packing, you could use if you need to transport the unit. **NEVER SHIP THE COMPRESSOR/NOISE GATE WITHOUT IT'S ORIGINAL PACKING.**

MOUNTING

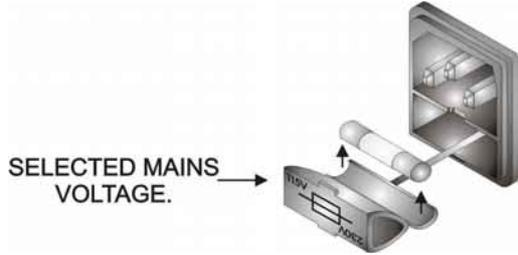
It is always advisable to mount the unit in rack, either for mobile or fixed installations, for protection, safety, aesthetics, etc.

The ALTAIR CN-220 is designed for standard 19" rack mounting, and occupy 1u high rack space.

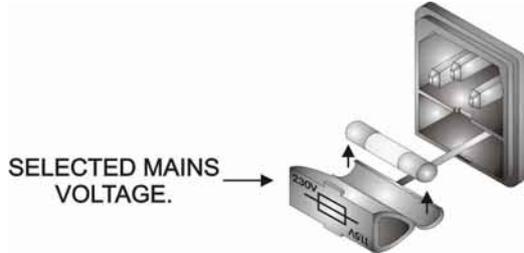
CHANGING THE VOLTAGE AND THE FUSE

The compressor/noise gate unit is set to operate at 230V, 50-60Hz and at 115V, 50-60Hz.

- 1 Make sure that the unit is disconnected of the mains.
- 2 In the unit rear panel, is placed the mains connector, the mains selector and the fuse holder. The box bellow this mains connector is called fuse holder + mains selector. Take out the fuse holder + mains selector.
- 3 Upon extracting the fuse holder, the fuse will appear, take out it and change for the new one.
- 4 Insert the fuse holder into the mains connector again, without spin it (make sure that the voltage to which it is going to connect the unit remains indicated in normal position, not inverted), if you only wants to change the fuse. If what you want are change the mains voltage, rotate the fuseholder until remains the mains voltage to which it is going to connect the unit in normal position, not inverted.



Compressor/noise gate set up to 115 V.



Compressor/noise gate set up to 230 V.

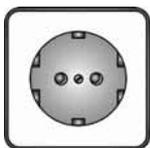
5 Make sure that the fuse is the right one for the selected voltage:

FUZE (230V. 50-60 Hz)	FUZE (115V. 50-60 Hz)
T0,5A.	T1A.

NOTE: The fuseholder provide a place for spare fuse.

CAUTION: Always make sure upon changing the fuse, that this is the adequate for the selected mains voltage (T1A for 115V and T0,5A for 230V).

CONNECTING TO THE MAINS



The connection of the compressor/noise gate power supply to the mains takes place by a standard cord included in the box.



- 1 Make sure that the unit power switch is at 0 position (turned off).
- 2 Insert the female I.E.C. connector of the tripolar cable into the unit power supply male connector, placed at the rear panel.
- 3 Insert the male connector of the tripolar cable into the mains plug.
- 4 Turn on the unit power switch. In that moment the ACTIVITY LED indicator (red or green) of the noise gate section will light, indicating that the unit is turned on.



CAUTION: Make sure that the mains voltage is the correct as well as their fuse is the adequate.

INPUT CONNECTION

The compressor/noise gate input signals is carried out through two XLR-3-31 female connectors and two JACK 1/4" wired internally in parallel mode, one per each channel. The input connections are balanced, with a nominal impedance of 10 KΩ (5 KΩ unbalanced). The next list shows the input pins correspondence as A.E.S recommendation practice:



XLR-3-31	
PIN 1	0 V
PIN 2	HOT (+)
PIN 3	COLD (-)



JACK 1/4"	
TIP	HOT (+)
RING	COLD (-)
SLEEVE	0 V



The input connection depends on two factors, the first is the type of input signal balanced or unbalanced, and the second the ground configuration of the sound source (floating or ground-referenced). The next pictures shows some of the different possibilities of connection, relying on the type of input signal, balanced or unbalanced and according to the ground configuration of the equipment (floating or ground-referenced).

In the next diagrams, we use the following symbols:



Sound source with mains cord without ground connection.



Sound source with mains cord with ground connection.



Sound source with the EARTH-LINK OFF.

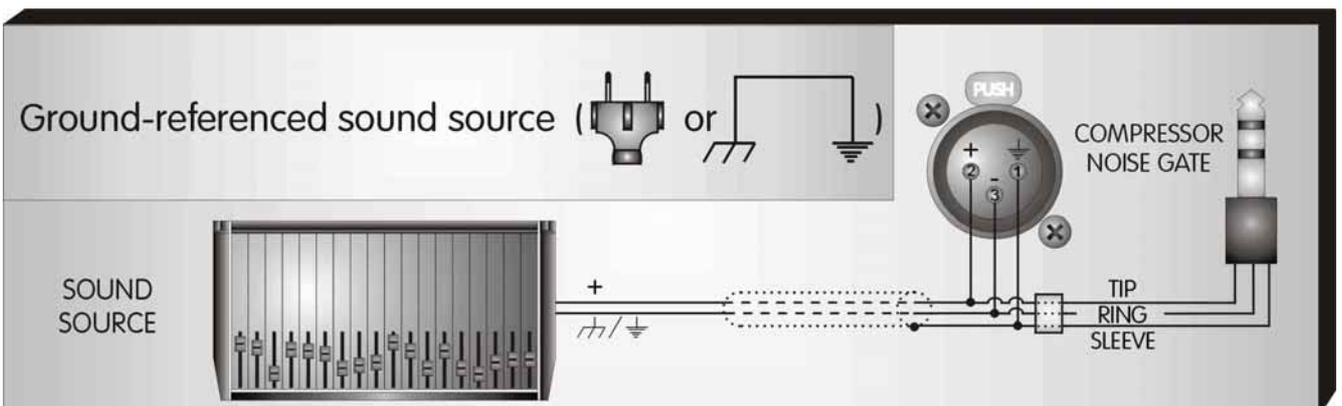
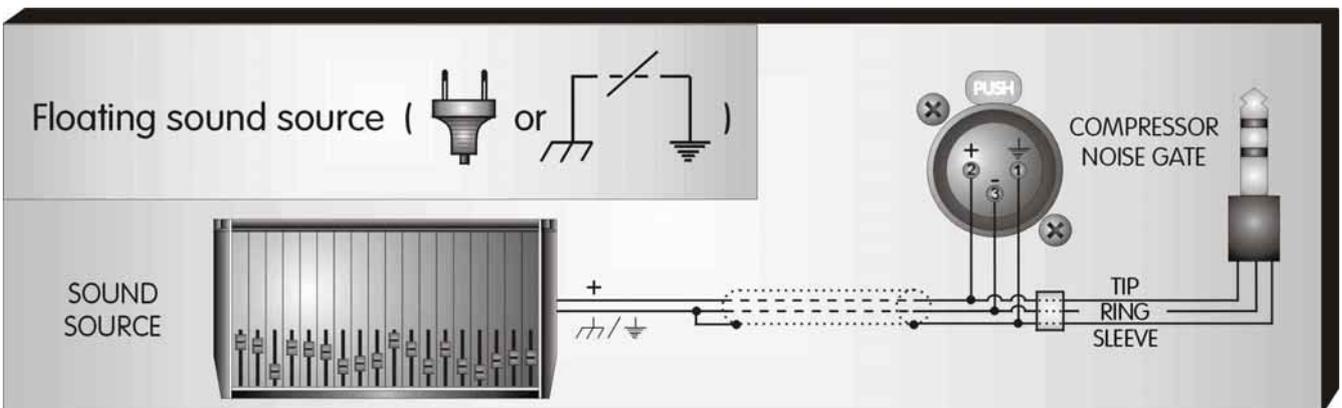


Sound source with the EARTH LINK ON.

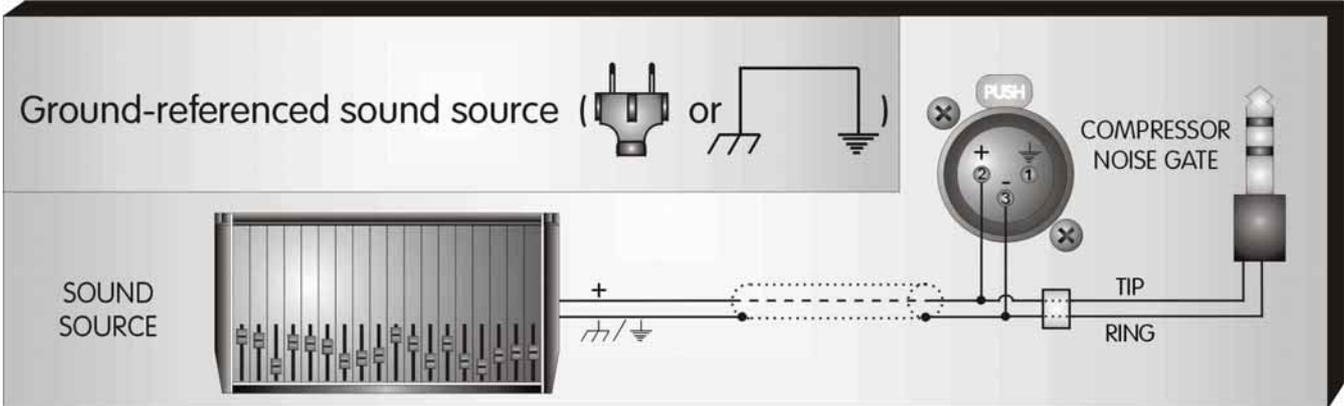
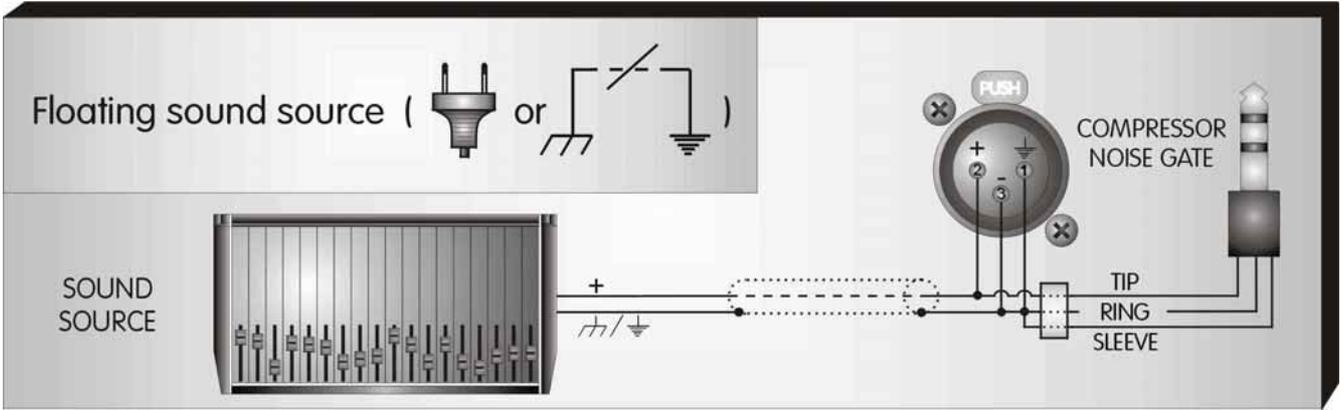
UNBALANCED INPUT

This type of connection will be used when the sound source doesn't provide balanced output. When possible, employ the connection type 1.

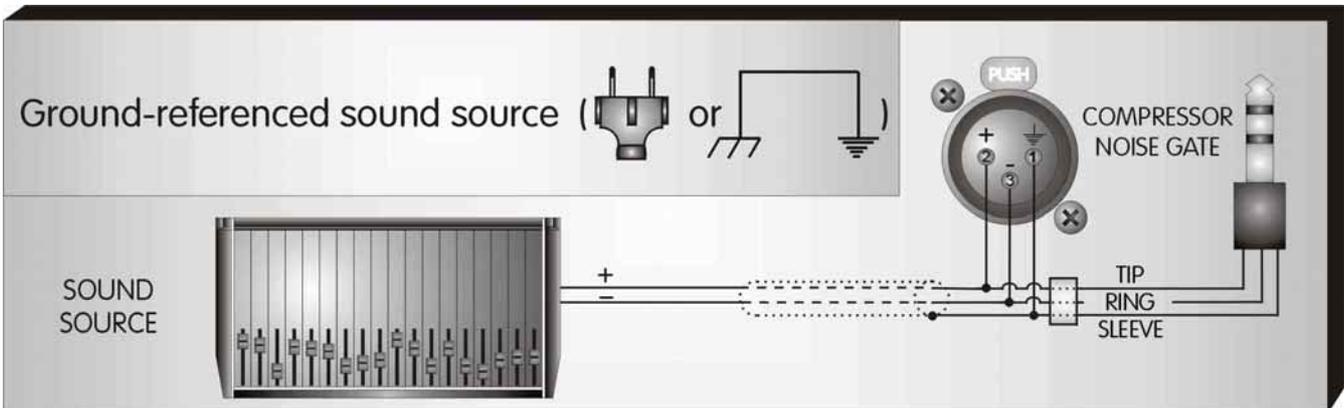
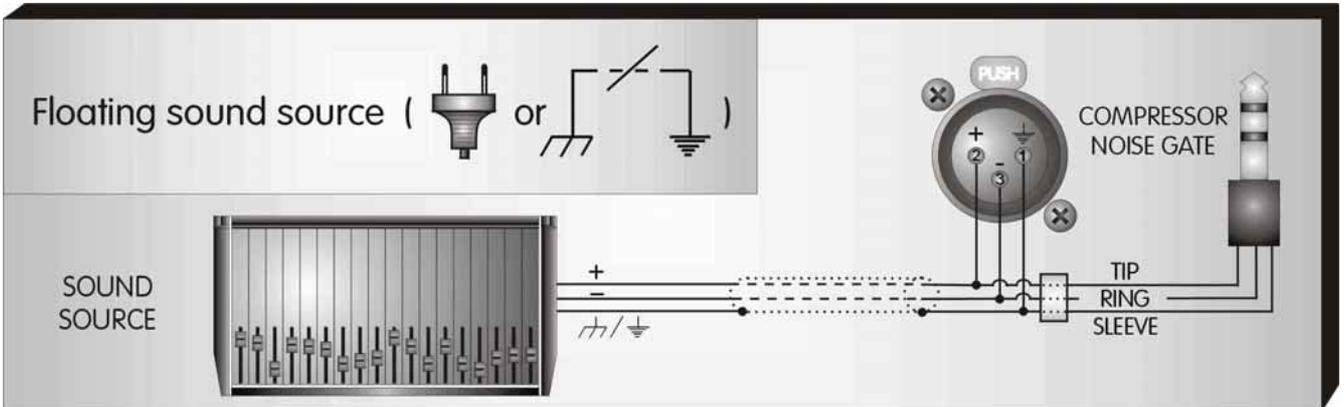
- Using twin-lead shielded cable:



2) Using single conductor shielded cable:

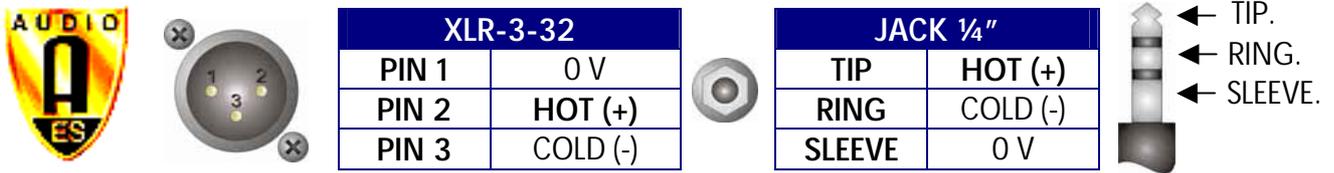


BALANCED INPUT



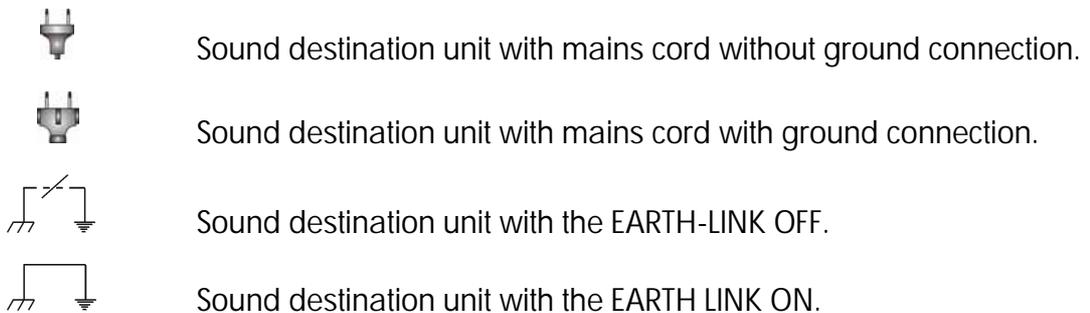
OUTPUT CONNECTION

The compressor/noise gate output signal is carried out through two XLR-3-32 male connectors and two JACK ¼" wired internally in parallel mode, one per each channel. The outputs are balanced, with a nominal impedance of 100 Ω. The next list shows the input pins correspondence as A.E.S recommendation practice:



The output connection depends on two factors, the first is the type of input signal balanced or unbalanced, and the second the ground configuration of the sound destination unit (floating or ground-referenced). The next pictures shows some of the different possibilities of connection, relying on the type of output signal, balanced or unbalanced and according to the ground configuration of the equipment (floating or ground-referenced).

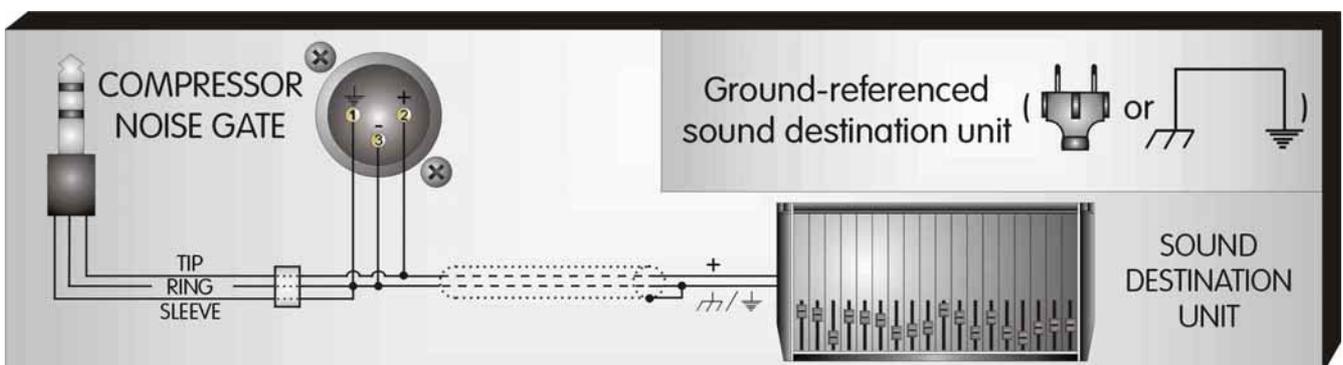
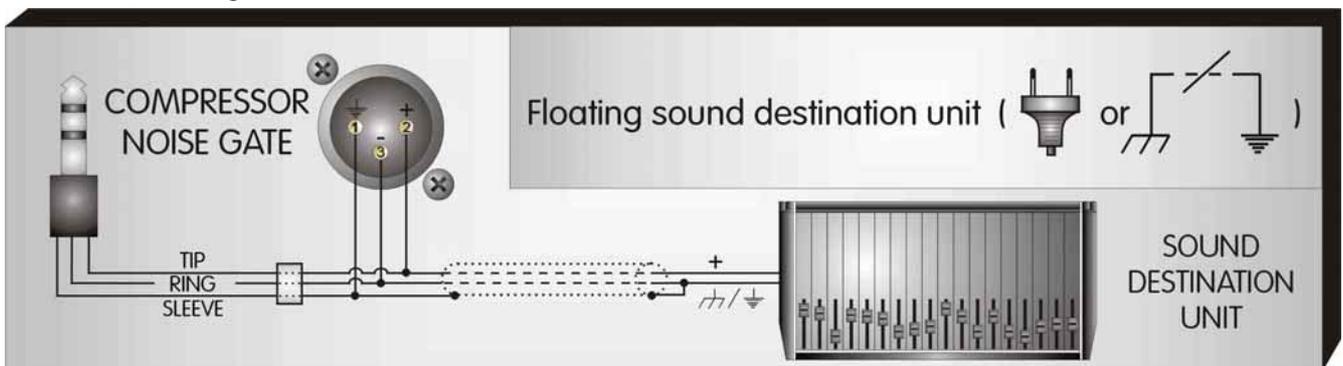
In the next diagrams, we use the following symbols:



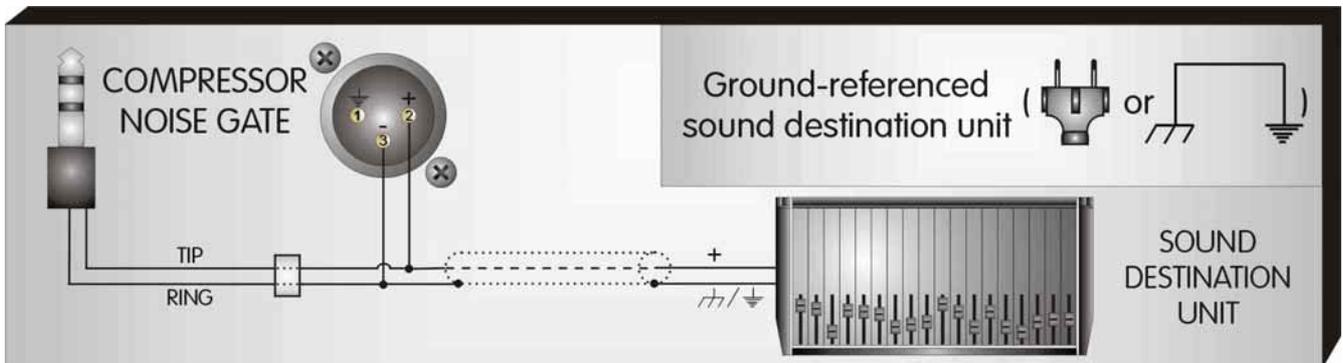
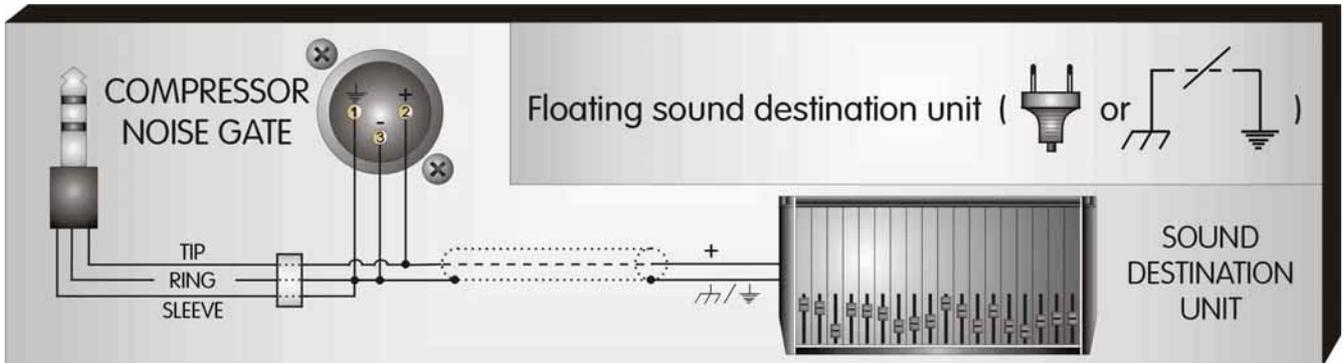
UNBALANCED OUTPUT

This type of connection will be used when the sound destination unit doesn't provide a balanced input. When possible, employ the connection type 1.

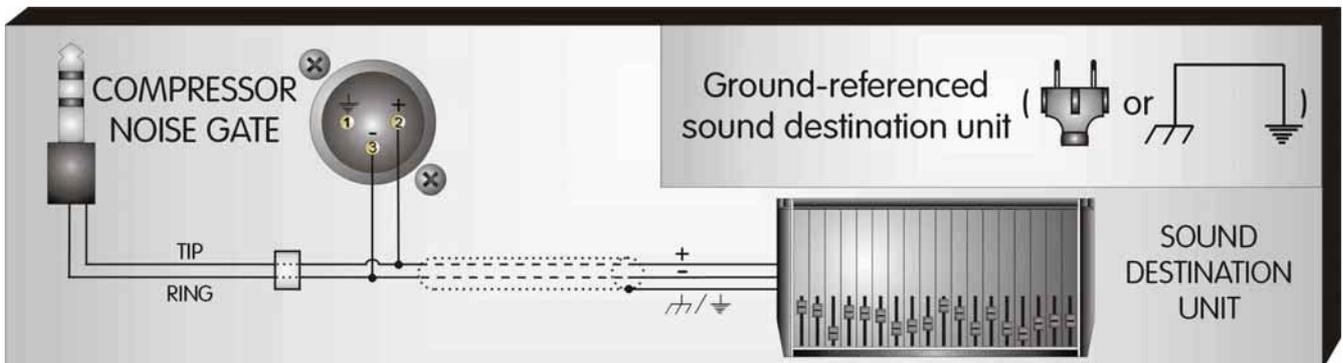
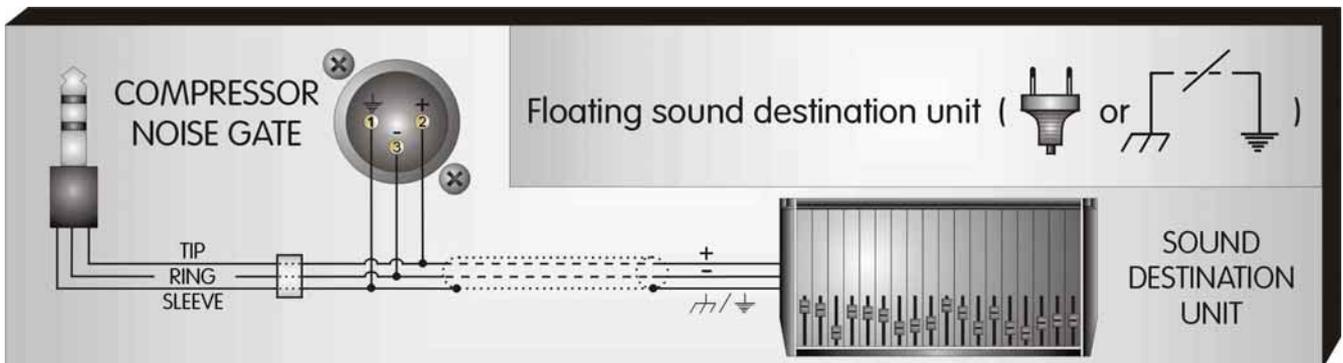
- Using twin-lead shielded cable:



2) Using single conductor shielded cable:



BALANCED INPUT



GROUND LINK

In some installations, it might be necessary to isolate the compressor/noise gate electric ground, from the system mains earth, in order to avoid ground loops that could generate

unwanted noises. For this reason, the unit provides an EARTH-LINK switch placed at the rear panel in order to lift the mains earth from the unit.



MAINS EARTH LINKED WITH THE COMPRESSOR/NOISE GATE ELECTRIC GROUND.



MAINS EARTH LIFTED FROM THE COMPRESSOR/NOISE GATE ELECTRIC GROUND.

NOTE: For security reasons, the earth connection to the mains is linked with the unit chassis in both cases.

CAUTION: Always operate the unit with the AC ground wire connected to the electrical system ground. Precautions should be taken so that the means of grounding of a piece of equipment is not defeated. For this circumstance, **NEVER** lift the mains earth AC ground to avoid possible accidents. For your security, **NEVER** use ground isolator adapters; instead it is recommended the EARTH -LINK switch.



5. OPERATION

The dynamic range of an audio equipment is limited by the maximum signal level that the audio equipment can drain without audible distortion and the noise generated by this audio equipment.

The noise, is generated by the audio equipment because of the current flowing the conductors, due to the random electron movements. For statistical reasons, this produces frequencies within the whole audio spectrum. This noise is called white noise. If this noise is then strongly amplified, a noise will be obtained perfectly audible.

The maximum signal level of the audio equipment is limited by the levels of the internal operating voltages. If the signal exceeded the internal operating voltages, audible signal distortion is the result. In practice, this limitation is greater, since a certain reserve must be maintained to avoid distortion of the audio signal if sudden level peak occur. In technical words, we refer to this reserve as "headroom". If we reduce the input signal level, we reduce the risk of signal distortion due to level peeks, however, at the same time, the noise floor level will be increased if we want obtain the same output signal level, since, we must amplify more.

The compressor/limiter act as automatic gain controls, decreasing the signal level above a certain level (THRESHOLD), restricting the dynamic range and allowing us increase the audio equipment headroom, without decrease the input signal level. The difference between a compressor and a limiter, is that limiters abruptly limit the signal above the threshold while the compressors will decrease the signal level above the threshold, depend on the compression ratio set up and the ratio of the input signal level and the threshold, it's to say, gradually.

How we explained previously, the noise limits the audio equipment dynamic range. The noise gates decrease the signal gain abruptly bellow the threshold allowing increase the audio equipment dynamic range, achieving the inverse function of a compressor/limiter.

The ALTAIR CN-220 incorporates a dual Compressor-Limiter with a full-featured Noise Gate connected internally.

NOISE GATE

TEST MONITOR SWITCH (SIDE TEST)



The side test switch, allow monitor the output signal obtained after the key filters to set up by ear the signal that we want to open the noise gate. It is a push button, because of that upon releasing it, the noise gate will return to its normal state.



This switch will be used only during the sound check since it disables the compressor and noise gate effect.

NOTE: The SIDE TEST switch, connect directly the key filters output with the unit output. Therefore, disable the compressor section, and the noise gate BYPASS switch.

STEREO: In stereo mode at the channel 2, this switch monitor the output signal obtained after the channel 2 key filters, but the noise gate trigger with the signal obtained of the channel 1 and channel 2 key filters average.

ACTIVITY LED's (SHUT – OPEN)

The activity LED's show the noise gate operation. The SHUT red LED indicate that the key filters signal level output, which trigger the noise gate, is bellow the threshold set up. The other OPEN green LED report that the key filters signal level output, which trigger the noise gate, is above the threshold set up.

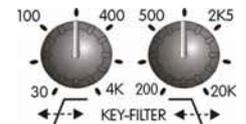


If the BYPASS switch is not depressed, when the SHUT red LED light, the noise gate will be decreasing the input signal gain, and when the OPEN green LED light, the signal will pass unchanged through the noise gate.

STEREO: In stereo mode, the channel 2 activity LED's, won't indicate the channel 2 noise gate operation. The channel 1 activity LED's will indicate the operation of both noise gates.

HP AND LP KEY FILTER CONTROLS

The lateral filters, filter the signal that will arrive to the noise gate detector, allowing to trigger the noise gate only with the desired instrument, or with the wanted bandwidth, avoiding false gating.



The high pass filter (HP) can vary between 30 Hz to 4 KHz, and the low pass filter can vary between 200 Hz and 20 KHz, allowing an adjustment in all the audible band

STEREO: Like starting point, it is convenient adjust both filters of both channels (channel 1 and 2) with the same settings since the control on both channels is obtained by the two signals trigger average.

THRESHOLD CONTROL

The threshold control allows set up the level above the signal will pass unchanged through the noise gate. If the level is bellow this threshold, the noise gate will be decreasing the input signal gain.



The threshold control can vary between -50 and +20 dBu.

ATTACK TIME SWITCH

The noise gate attack time is defined, as the delay in the noise gate opening (allow to pass the signal unchanged) when a signal rise above the threshold level set up.



With the ATTACK switch depressed, the noise gate attack time will be configured in AUTO mode. In this mode, the noise gate detector adapts the attack time to the input program content, allowing an easy and quick noise gate adjustment on the part of the user.



With the ATTACK switch pressed, the noise gate attack time will be configured in FAST mode. In this mode, the attack time is very fast, saving the signal rise edge. Therefore, in this mode the noise gate adjustment is more difficult.

RELEASE TIME CONTROL

The noise gate hold time is defined as the delay in the noise gate closing (decreasing the input signal gain) when a signal drop the threshold level set up.

The release time begins after the hold time, and ends when the gain reduction adjusted with the RANGE switch is achieved.

The release time control adjust the noise gate release time between 10 msg and 2 sg, and at the same time set up a hold time according with the release time adjustment.



RANGE SWITCH

The range switch determines the amount of gain reduction produced in the program signal when the noise gate is close. With this switch depressed, the program gain reduction will be 80 dB, and with this switch pressed, the program gain reduction will be 20 dB.

In most of the applications, it is preferable use the 20 dB range, that although it don't produce a total gate, and introduce less adverse effects when signals with much noise floor are processed.



BYPASS SWITCH

When we press this noise gate bypass switch, the noise gate will be disabled and the controls and switched won't be operative. The activity LED's continue working indicating our set up, but the program signal will pass unchanged through the noise gate.



COMPRESSOR

BAND COMPRESSOR CONTROL AND SWITCH

When the band compressor is active, it's to say, with the ON switch pressed, the compressor stops compressing in the whole audio spectrum, in order to only compress in the selected band. With the ON switch depresses, the compressor work normally (in the whole audio spectrum).

The band compressor control, allow to configure the selected band from 80 Hz to 10 KHz. Configured the band compressor control between 5 KHz and 10 KHz works like DE-ESSER, it allow to reduce notably the sibilance effect that takes place with the treatment of vocals with a great content in high frequencies, mainly with the letter "s."

In band compressor mode, the compression ratio and the threshold adjusts continues working.



STEREO: In stereo mode, any of the ON switches will put both compressors in band compressor mode, however, the band compressor control will be independent in both channels, for that if you want that the band compressors work symmetrical, both controls will placed at the same position.

THRESHOLD CONTROL

The threshold control sets the level where compression will begin. The signals below the level defined at the threshold control will pass unchanged and

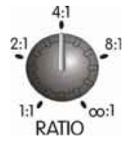




the signals above the level defined at the threshold control will be compressed in correspondence with the compression ratio control adjustment. The threshold range control varies from -40 to +20 dBu.

COMPRESSION RATIO CONTROL

The compression ratio controls the amount of compression, which will happen once the input signal crosses the threshold level. Its adjustment determines the number of dB that the input signal should increase, in order to increase a dB the output signal, whenever the input signal cross the threshold level. For example, if we adjusted the compression ratio control to 4: 1, the variation of 4 dB in the input signal will be reflected in the output as only 1 dB variation. A variation of 8 dB, will produce 2 dB of variation, etc.



If we adjusted the compression ratio control to 1: 1, the input signal won't be modified for the compressor, for what we will have a compressor BYPASS, and the threshold control won't affect.

Adjusting the compression ratio to infinity:1, the compressor will work like a limiter, that to say, the output signal will never overcome the threshold level adjustment, no matter how much above the threshold the input signal goes.

GAIN REDUCTION VUMETER

The gain reduction produced by the input signal compression, it is indicated in this vumeter, allowing us in all moment the visualisation of the compressor action. This vumeter is composed by 8 LED's (30, 20, 15, 12, 9, 6, 4 and 2 dB).



BYPASS SWITCH

When we press this compressor bypass switch, the compressor will be disabled and the controls and switched won't be operative. The gain reduction vumeter will turn off indicating that the input signal is not compressed. This switch is totally independent of the noise gate BYPASS.



COMMON

OUTPUT LEVEL CONTROL

The output level control, allow to attenuate or amplify the output signal of -15 to +15 dB. This control is useful for making up gain which was reduced by the compression or matching the input level of a mixer or recorder. This control is enabled although the BYPASS switches of the noise gate and the compressor are pressed



OUTPUT LEVEL VU-METER

The output level is indicated constantly by this vu-meter, compound for 12 LED's (30,- 20,- 12,- 8,- 4,- 2, 0, 2, 4, 8, 12 and 16 dB). The red 16 dB LED indicates that we have a high level in the output, however, to this level the unit is not saturated still, since it has a "headroom" of 5 dB.



If we want to know the signal input level, we will press the noise gate and compressor BYPASS switches and we will locate the output level control to 0 dB (centered), and this vu-meter will indicate us directly the input level.



CAUTION: In Band Compressor mode, the headroom is more limited for what it is not advisable overcome the 16 dB of output level when we operate with negative adjustment of the output level control.

STEREO SWITCH

The stereo switch, allow us to select the unit working mode. With this switch depressed, the unit operation mode is DUAL, this permit us the treatment of two independent signals, adjusting each noise gates and compressor of independent mode. Upon pressing the switch, the channel 2 will be slave of the channel 1, for what the controls of the channel 2 will be disabled (except for the cases specified with the STEREO note: TEST MONITOR SWITCH, ACTIVITY LED's, HP AND LP KEY FILTER CONTROLS and BAND COMPRESSOR SWITCH AND CONTROL, explained each one in their corresponding section).



NOTE: In STEREO mode the signal that arrives to the noise gate and compressor detectors, is an average of the two input signals.

SIDE CHAIN CONNECTOR

In the noise gate and compressor normal operation, the input signal is used for the noise gate and compressor detector in order to carry out the noise gate triggers and compress the same input signal. This ¼" stereo JACK connector allow to use another signal (or the same input signal processed) in order to trigger the noise gate and compress the input signal according to the adjusted parameters.



In order to introduce a signal different from the input signal, we will use a ¼" mono JACK , with the signal in the tip.

If we want to process (equalise, expand, level change, etc.) the input signal, we will connect a ¼" stereo JACK , and we will obtain the input signal the ring, and we will return to the unit for the tip.

The external control JACK connector input and output are unbalanced.

The input impedance is 10 K Ω , and the output impedance is 220 Ω . The input and output SIDE CHAIN nominal level is - 3 dB.

NOTE: In the Band Compressor mode, the external control is disabled.

6. OPTIONS

In this section will explain the different available options for the unit.

SECURITY COVER (TP-1)

In some installation, it could be necessary to tamper proof the front panel controls avoiding unwanted or accidental manipulations. For this purpose, it is available as an option, a transparent plastic security cover. The installation is very easy, by means of two screws provided.

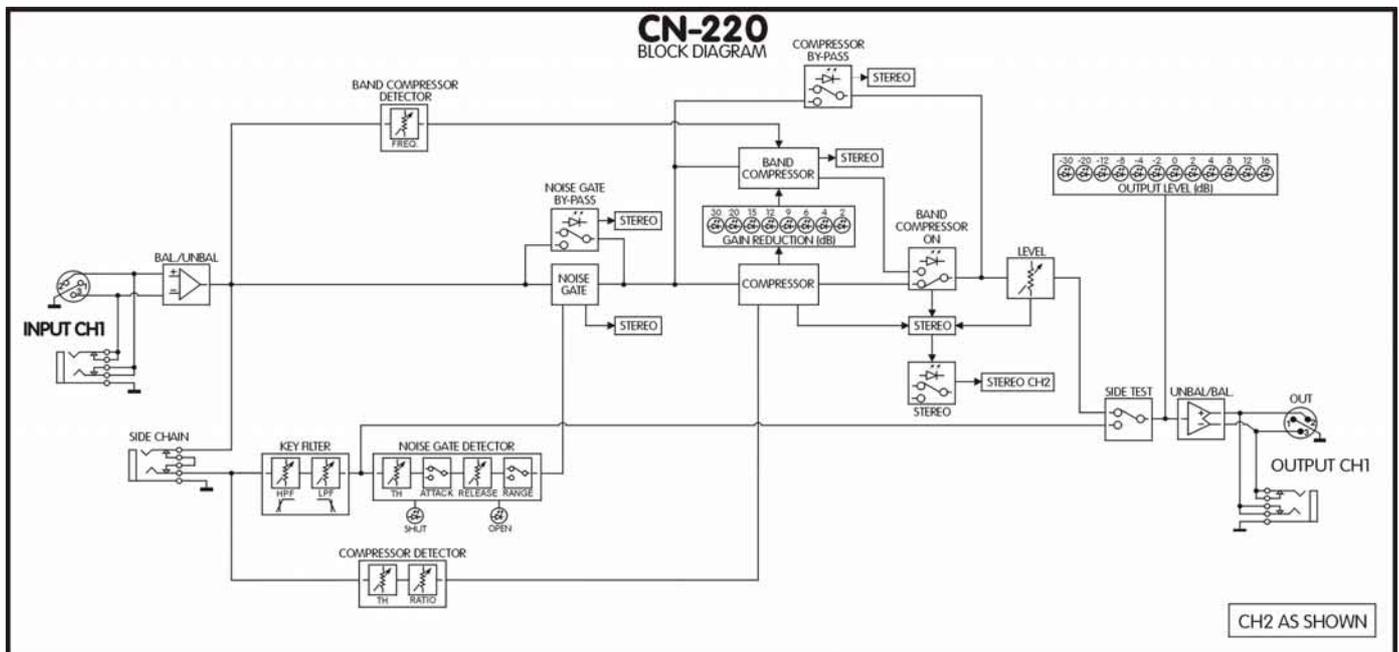
KEY LOCKED SECURITY COVER (TS-1)

In some installations it is necessary isolate the compressor/noise gate controls more securely than with the plastic security cover. For this extra protection, it is available an all-metallic and lockable security cover. This option cover fits into the four rack holes of the unit and includes rear nut-bars allowing the installation as a stand-alone unit.

This cover prevents also from unauthorised extraction of the unit when rack mounted.

7. BLOCK DIAGRAM AND HOW IT WORKS

In the following shows the compressor/noise gate block diagram. It is draw the channel 1, since the other is identical, they are simplified (only the options are shown)



In the input stage, we have XLR and JACK connectors wired internally in parallel for the input signal. Following the signal is electronically unbalanced and crosses the SIDE CHAIN JACK, next the signal crosses the HP and LP noise gate key filters and the compressor detector. Note that the BAND COMPRESSOR detector doesn't go by the SIDE CHAIN JACK, for that in BAND COMPRESSOR mode we could not introduce an external control signal.

At the same time the sign crosses the noise gate, controlled by their detector, and their corresponding BYPASS switch, and in this point, the signal split to the compressor and to the BAND COMPRESSOR, controlled by their corresponding detectors. The compressor and the BAND COMPRESSOR act on the GAIN REDUCTION vu-meter, in order to indicate the gain reduction made on the input signal. Following the BAND COMPRESSOR ON switch, without pressing gets the compressor output signal, and pressed the BAND COMPRESSOR one. How you can see, the compressor BYPASS switch puts the compressor in BYPASS, as well as the BAND COMPRESSOR.

In the output stage, we were the output level adjustment, and the SIDE TEST switch, that upon pressing get the output directly of the noise gate HP and LP KEY FILTERS. In the SIDE TEST output is gotten the output level vu-meter reference and later the signal is balanced and goes to the output XLR and JACK, wired in parallel.

The stereo switch, allow us to select the unit working mode.

8. REPAIR GUIDE

For service purposes, the unit must be open by removing the seven screws on the top cover.

NOTE: This type of operations takes place with the unit open, for what it should be carried out by a qualified technician.



DANGER: Before opening the unit, disconnect it from the mains. It is important to indicate that although the unit is power out (with the power switch in 0 position), if it continues connected to the mains there are different parts of the unit that are subjected to high voltage.

CAUTION: Protect the compressor/noise gate from the rain and moisture, mainly if it is open. If liquid is spilled into the unit, disconnect it from the mains and consult a qualified service technician.

Keep in mind that both outputs are symmetrical, so when the section is identified, you could interchange components, except for the circuits that are common as could be the power supply.

We recommend a meticulous visual exam before beginning to change anything in the unit: burnt resistors, potentiometers with a broken trace, etc. This exam many times gives us the key for the problem, saving time and unnecessary efforts.

Keep in mind when removing an element of the main board, that it is single layer printed circuit, and the components PADS could get up if applies them an excessive heat. This is important mainly in components having many pins (integrated circuits, connectors, etc.), for which it is recommended to use a good desoldering station.

Next paragraphs details some of the most frequent fixes as a guide to the qualified technical service helping to repair the unit:

1 If a fuse break due to a mains transient or when the unit has been connected accidentally to 380 line voltages, replace it with the same ratings as described before. If it breaks again, check the overvoltage protections placed on the voltage selector. If broken, substitute them by an equivalent part (130 volts VARISTOR).

2 If the power supply fails, it is necessary to check the rectifier bridge (D13), the filter capacitors (C55, C56, C57 and C58) and the regulators (U31 and U32). Keep in mind that if the unit has been turned on, the regulators heatsinks could be hot, with the rising danger of burns.

Upon changing the damaged element, it is necessary to ascertain that no element is overheating in the main board, since this can be origin of the problem.

3 The potentiometers have a limited live span; they could become dirty and produce noise upon moving them. It is important that you don't use sprays cleaners over the potentiometers, since they can become damaged shortly. We recommended cleaning it by compressed air only.

In order to change a potentiometer, the unit must be opened. Care must be taken when removing the bottom cover as the line transformer is attached to it.

To remove the front panel, extract all five visible screws. The sub-panel behind the front panel is joined to the chassis by four screws located in the chassis sides and by the potentiometers. Special care must be taken when re-install the front panel because some delicate parts as the LED lamps must be introduced in small panel holes and it is a not easy operation.

4 Normally the signal reductions in the unit are produced by three causes: the LEVEL potentiometers, the unbalanced circuit and the electronic balanced one. In the unbalanced and electronic balanced circuits, a signal reduction around 6 dB reveals that one halves of the circuit has any trouble. The LEVEL potentiometers failures gives also sudden random signal reductions as well as swinging signals.



9. APPLICATION EXAMPLES

SUPPRESSING CROSSTALK IN MULTI-MIC APPLICATIONS

The most frequent application of a noise gate is the elimination of unwanted crosstalk between microphones during recording and playback, mainly in the drum sounds, because here several microphones closely positioned next to each other. By this reason it is desirable to gate each microphone in order to avoid the crosstalk in adjacent microphones.

In order to begin, it is important the microphones placement, so that they capture the minor possible signal of the adjacent instruments. Once placed, adjust the noise gate HP and LP KEY FILTERS, so that the noise gate is only triggered with the sound of the instrument that we want to gate. Use the SIDE TEST function to monitor the signal that will trigger the noise gate.

Adjust the noise gate THRESHOLD, so that the threshold level remain lower than the minimum signal produced by the instrument, and higher than the crosstalk signals of the adjacent instruments (this maybe is the most delicate step).

Lastly, adjust the noise gate RELEASE, so that the instrument overall sound character will be retained.

GATING DRUMS

"The difference between rally musically effective drum gating and disastrous gating is a fine line. Ambience, crash cymbals, resonating skins and snare and hi-hat bleed are among the most common pests when recording acoustic drums. The following tips may help you elude any of these bleed problems and allow all drum effects or equalisers to receive the cleanest of uninterrupted, natural drum sounds. With this application, we will be used the two channels of the noise gate and two channels of the mixer console.

For key mic, routing and patched, gated signal.

Step 1: Set up two microphones on the snare, one underneath, almost touching the snares (key mic), your second microphone normally positioned one to four inches away above the snare (snare mic).

Step 2: Set up gate getting on snare mic, not choking signal with too much threshold.

Step 3: Solo key mic input; set up gate on key mic with fast release, fast attack, tightest possible threshold (you'll just hear a tick with snare contact) and maximum range (80 dB).

Step 4: At this point you must patch output of gated key mic signal to the SIDE CHAIN input on snare mic gate, so that the key mic gate trigger the snare mic gate.

This method of gating will completely separate snare, tom and kick signals without injuring in any way the natural sound qualities of each of these drums, therefore allowing effects and equalisers to receive the cleanest possible send."

Stacey T. Heydon – producer/engineer (Sheriff #1 single), guitarist (David Bowie).

REDUCING BACKGROUND NOISE

In applications that have a high background noise: recording plate noise, guitars and bass amplifiers noise, broadcast applications with a wide auditory and multiple microphones, etc., could be eliminated with the noise gate.

Adjust the noise gate HP and LP KEY FILTERS, in vocal applications in the voice frequency range, in applications with bass or guitar covers the instrument bandwidth, in full range applications leave the filters full range, so that the noise gate is only triggered with the sound of the instrument that we want to gate. Use the SIDE TEST function to monitor the signal that will trigger the noise gate.



Adjust the noise gate THRESHOLD, so that the threshold level remain lower than the minimum signal produced by the instrument, and higher than the noise background signals (this maybe is the most delicate step).

Lastly, adjust the noise gate RELEASE, so that the instrument overall sound character will be retained.

REDUCING FEEDBACK IN MICROPHONES WITH HIGH COMPRESSION

In stage microphones, for voice treatment, if the signal is high compressed, upon taking place a pause in the signal, the compressor automatically increases their gain (upon falling the signal below the compression threshold, it stop compressing the signal), and it could give rise to feedbacks.

The noise gate could be used in order to eliminate these feedbacks. Upon introducing the noise gate in the signal path, if a pause in the sign takes place and falls below the noise gate threshold, the noise gate will reduce the gain compensating the increase of gain due to the compressor, for what the feedback won't take place.

With the attack time switch in AUTO and the range switch in 80 dB (it could use configured to 20 dB if you are wanted to simplify the adjustment), adjust the noise gate threshold, so that mute the microphone when the signal pauses take place (this maybe is the most delicate step).

Lastly, adjust the noise gate RELEASE, so that the overall sound character will be retained.

LEVEL VARIATIONS IN VOICES AND INSTRUMENTS

When there is a variation in the distance between the singer or vocalist and the microphone, a change in the signal level takes place. This effect could be reduced with the compressor/ limiter: Adjust the compression ratio between 2:1 and 4:1 and immediately adjust the compression threshold until a good result is reached. If necessary, it is possible to vary the compression ratio again.

From the same way, it is possible to regulate the instruments level variations, being able to maintain present the bass sound and stabilising the level changes in the jack level in several keyboards. Adjust the compression ratio, like in the previous case, between 2:1 and 4:1, and the compression threshold until obtain the wanted result. The compression will produce us a sonority decrease produced by the variations between the instrument cords, increasing the notes maintenance and reducing the excess of sibilance.

RECORDINGS

During the recordings, the compressor/limiter adapts the program dynamic margin to the support used, if the program has a dynamic margin of 100 dB, and the recording support has a dynamic margin of 80 dB, it will be necessary to reduce the program dynamic margin to 80 dB. For this application, adjust the compression ratio to 2:1, and adjust the compression threshold so that the program strongest signal produces a gain reduction of 15 or 20 dB. Lastly, adjust the output level in order to obtain 0 dBu at the recording unit. If adjust the unit like limiter, it cancel the peaks to avoid the band saturation.

SPEAKER PROTECTION

The compressor/ limiter is largely used to prevent possible breaks-downs in the speakers, due to abusive manipulations and certain negligences such as break of cables, falling of mics, etc. The compressor/ limiter improves the intelligibility of the speakers, since it allows that low level signals are reproduced by the system with the maximum amplification.



The compressor/limiter adjustment for this application depends on the speakers system characteristics, but in circumstances in which the break risk of the speakers increases, many technicians adjust the compression ratio to $\infty:1$, that is to say adjusted like limiter, depending the compression threshold adjustment on the speaker system characteristics.

PRODUCING THE TALKOVER EFFECT

To produce the talkover effect in the signal, all we have to do is to introduce part of the voice signal (or channel line output) that we want to project from the general level, into the compressor SIDE CHAIN input. When the signal introduced into the INSERT input surpass the compression threshold, the program signal level will descend automatically. Of course, if we don't want the voice affected by this compression, it should not be introduced into the compressor. This is easily achieved using SUBGROUPS.

INCREASING THE OUTPUT LEVEL OF A MIXING SIGNAL

It is possible to separate voices and instruments of a mix signal, by means of a frequency compression. The way to do it is to introduce a graphic equaliser in the compressor SIDE CHAIN input. The equaliser must equalise the programmed signal, and must introduce it in the compressor SIDE CHAIN input, while the compressor input is connected to the program signal (of course, this has not been equalised). The bands amplified by the equaliser will show up more compressed in the output signal, and the output signal will not be affected by the phase changes produced by the equaliser, once the compressor threshold is reached. Of course, the output level of the whole program is affected when the compression takes place, and so we will have to adjust the output level control.

SOUND PRESSURE LEVEL CONTROL

The compressor/limiter has a wide range of application in sound pressure level control of discos and pubs in order to warrant the maximum level authorised by the local authority. With this purpose, it is always placed in the last point of the audio chain, that is to say, before the power amplifier, or before the active divisor if working in multi-amplification. If the hall has a graphic equaliser, it is highly advisable to keep it out of the reach of the DJ; that is why it will be protected with a sealed lid once the equalisation has taken place.

To adjust the compressor, connect the compressor inputs to the equaliser outputs or mixing console and connect the outputs to the power stage inputs. Choose a recording containing a big percussive and loud sound. Adjust the pick-up sensitivity, that channel fader and the master to the maximum. Select the STEREO operation mode by pressing the compressor STEREO button (the RATIO, THRESHOLD and OUTPUT controls will depend on its adjustment in the CH1 channel in both channels for this operation mode). Adjust the RATIO control to $\infty:1$ if the hall is very problematic or to 8:1 if it is not. Adjust the THRESHOLD (compression threshold) to the left until the GAIN REDUCTION indicator indicates 15 dB in the program peaks. Adjust the OUTPUT control to -15 dB. Connect the power amplifier/s with their gain controls to the maximum.

Now the moment has come to use a the sound pressure level measuring system, in the hall, or in the street or behind the hall walls in the house subject to protection. Increase the OUTPUT control by turning it to the right, until it reaches to the maximum level authorised for the sonometer in that point. This operation is more reliable if the noises produced by the customers in the hall are included in the measures.

If the outcomes are not entirely satisfactory, repeat every adjustment, but adjusting the THRESHOLD until the gain reduction reaches 20 dB.

Finally, it is advisable to try different musical programs and to vary the mixer equalisation in order to make a final touch in the output level control.

Once the compressor is adjusted to, your liking it is as well to put the plastic protection lead and to seal it if necessary.

SELECTIVE SOUND PRESSURE LEVEL CONTROL

The sound transmission level through a body depends, among other things, on the frequency (the low sounds are more transmitted than the high-pitched through the walls), and therefore there are times when a selective sound pressure level control is necessary, in order to make possible to increase the power later.

In order to do that, insert the equalised signal in the SIDE CHAIN input, as explained in section INCREASING THE OUTPUT LEVEL OF A MIXING SIGNAL . The equaliser must be adjusted by imitating the sound transference operation through the wall. Because of this, this transference operation has to be measured (for instance; by using an spectrum analyser) in the room we want to "isolate" from these frequencies. Of course, this measurement will be made in the usual pressure conditions of the hall.

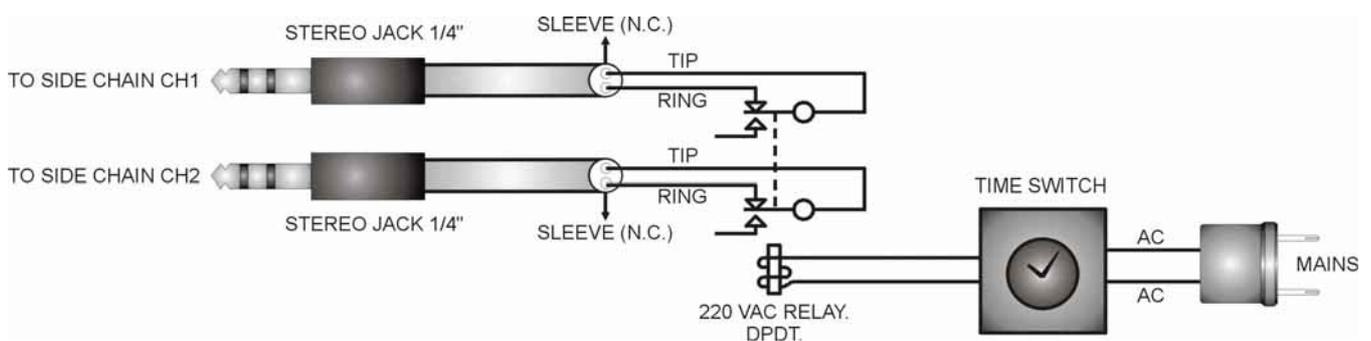
This procedure, extensible to any frequency band, can be a great resort for problems in the transmission of structures, without having to reduce excessively the global level of the room because of it.

TIME CONTROL

In many local legislations, the allowed sound pressure levels depend on the time of the day, and because of it is very usual to operate the compressor/limiter only from a certain time. In order to accomplish this, we will use an standard time switch and a relay with a 220 VAC. coil and with a double reverse circuit, connected as explained in attached picture. The time switch will be protected in a sealed box with legal purposes.

As can be seen in the block diagram, the signal controlled by the detector, and therefore the compressor dynamic, pass through the SIDE CHAIN connector, in such a way that the compressor will stop compressing if we interrupt it. With the relay activated (as showed in the picture), the compressor will start operating. The signal cable must be short and screened, because the primary circuit goes to the mains.

To avoid noises or mains isolations, it is better to put a transformer of 220 to 12V in the time switch output, for instance, and use a relay of 12 V. of alternate. Another solution may be to use a 9 or 12 V. converter of DC and use a relay of DC of 9 or 12 V, being perhaps the most safe and economic.





10. TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS		
INPUTS:	<ul style="list-style-type: none"> XLR-3-31 and JACK ¼". 	
INPUT IMPEDANCE:	<ul style="list-style-type: none"> 20 KΩ. Electronically balanced. 	
INPUT LEVEL:	<ul style="list-style-type: none"> 0 dBu nominal / +24 dBu maximum. 	
OUTPUTS:	<ul style="list-style-type: none"> XLR-3-32 and JACK ¼". 	
OUTPUT IMPEDANCE:	<ul style="list-style-type: none"> 100Ω. Electronically balanced. 	
OUTPUT LEVEL:	<ul style="list-style-type: none"> 0 dBu nominal / +24 dBu maximum. 	
SIDE CHAIN INPUT/OUTPUT:	<ul style="list-style-type: none"> JACK ¼" unbalanced. 0 dBu nominal / +21 dBu maximum. 	
FREQUENCY RESPONSE:	<ul style="list-style-type: none"> 20 Hz to 40 KHz (+0, -0.5 dB). 	
DISTORTION:	<ul style="list-style-type: none"> THD+N < 0,03% @ 0 dBu (20 Hz- 20 KHz) no compression. THD+N < 0,05% @ 0 dBu (1KHz) @ 20 dB compression. IMD < 0,03% @ 0 dBu (20 Hz- 20 KHz) no compression. 	
INTERCHANNEL CROSSTALK:	<ul style="list-style-type: none"> Better than 80 dB (20 Hz - 20 KHz). 	
C.M.R.R.:	<ul style="list-style-type: none"> Better than 60 dB (20 Hz - 20 KHz). 	
OUTPUT NOISE:	<ul style="list-style-type: none"> Better than -96 dBu, (20 Hz - 20 KHz), unweighted. Gate section in By-pass. Better than -98 dBu, (20 Hz - 20 KHz), unweighted. Gate section in SHUT state. 	
OUTPUT GAIN:	<ul style="list-style-type: none"> Variable from -15 dB to +15 dB. Detent position at 0 dB. 	
GATE SECTION	FILTERS:	<ul style="list-style-type: none"> HPF: 30 Hz – 4 KHz, LPF: 200 Hz – 20 KHz.
	THRESHOLD:	<ul style="list-style-type: none"> Variable from -50 dBu to +20 dBu.
	ATTACK TIME:	<ul style="list-style-type: none"> AUTO mode: Program dependent. FAST mode: T < 100 μsg.
	RELEASE TIME:	<ul style="list-style-type: none"> Variable from 10 msg to 2 sg.
	RANGE:	<ul style="list-style-type: none"> SHUT state attenuation 80 dB/20 dB.
COMPRESSION SECTION	THRESHOLD:	<ul style="list-style-type: none"> Variable from -40 dBu to + 20 dBu.
	THRESHOLD TRANSITION:	<ul style="list-style-type: none"> "Soft Knee" type contour.
	ATTACK/RELEASE TIMES:	<ul style="list-style-type: none"> Automatic: Program content dependent.
	RATIO:	<ul style="list-style-type: none"> Variable from 1:1 (no compression) to ∞:1 (limiter).
	BAND COMPRESSOR:	<ul style="list-style-type: none"> Variable from 80 Hz to 10 KHz.
MAINS SUPPLY:	<ul style="list-style-type: none"> User selectable 115/230 VAC ±12%, 50-60 Hz. 	
POWER REQUIREMENT:	<ul style="list-style-type: none"> 30 V.A. 	
DIMENSIONS:	<ul style="list-style-type: none"> 483x44x160 mm. (19" x 1u). 	
OPTIONS:	<ul style="list-style-type: none"> Plastic or metal (key protected) security cover. 	

NOTE: Technical specifications subject to variation without previous notice.



11. WARRANTY

This unit is warranted by Equipos Europeos Electrónicos to the original user, against flaws in the manufacturing and in the materials, for a period of one year, starting from the date of sale.

Flaws due to wrong use of the unit, internal modifications or accidents, are not covered by this warranty.

There is no other warranty expressed or implicit.

Any faulty unit must be sent, to the dealer or the manufacturer. The serial number of the unit must be included with any request for the technical service.

Equipos Europeos Electrónicos reserves the right to modify the prices or the technical specifications without notice.

SERIAL NUMBER



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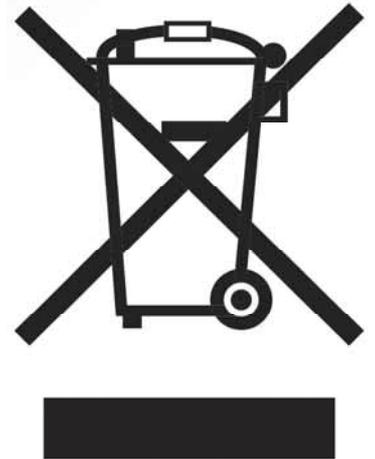
European Union Waste Electronics Information Unión Europea Información sobre residuos electrónicos

Waste from Electrical and Electronic Equipment (WEEE) directive

The WEEE logo signifies specific recycling programs and procedures for electronic products in countries of the European Union. We encourage the recycling of our products. If you have further questions about recycling, contact your local sales office.

Directiva sobre Residuos de Aparatos Eléctricos y Electrónicos (RAEE)

El logotipo de la Directiva RAEE se refiere a los programas y procedimientos específicos de reciclaje para aparatos electrónicos de países de la Unión Europea. Recomendamos el reciclaje de nuestros productos. Si tiene alguna consulta, póngase en contacto con su Distribuidor.



Information based on European Union WEEE Directive 2002/96/EC

Información basada en la Directiva de la unión europea RAEE 2002/96/EC y el Real Decreto 208/2005

AUDIO ELECTRONICS DESIGN

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