SMX DUAL
COMPRESSOR PEDAL

OPERATING
INSTRUCTIONS

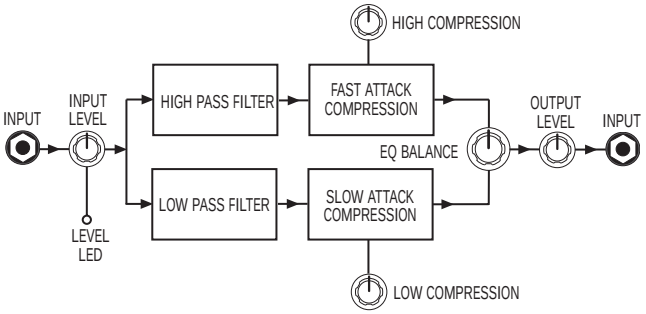
TRACE ELLIOT

EFFECTS
PEDAL

General overview

It is important to understand a little of what goes on inside the SMX pedal to give you an idea of what is happening to your sound as you adjust the units controls. To help with this a short description follows prior to the actual operating instructions.

The SMX DUAL COMPRESSOR is two separate compressors in one unit, each compressor has its parameters set to suit the frequency band that it is dealing with i.e. Fast attack for the High frequencies and Slow attack for the Low frequencies. Two input filters are used to split the signal into its High and Low frequency components, the output from these feed the High and Low compressors. The EQ BALANCE control sets a crossfade between the output of the two compressors and provides an extremely versatile and entirely new form of powerful tone control. See BLOCK DIAGRAM below:-

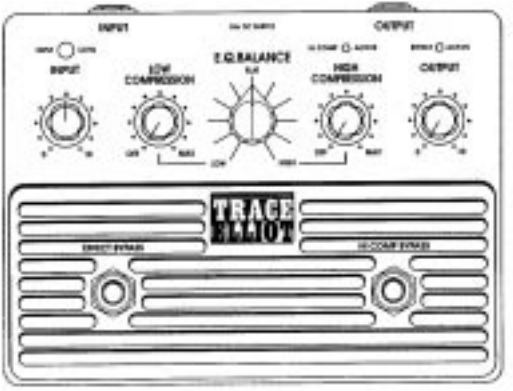


The SMX PEDAL can increase sustain on any note or harmonic, smooth out playing dynamics, add definition to fast runs, provide a switchable volume boost, provide a wide range of EQ's that are easily and instantly adjustable, provide HIGH or LOW compression or any combination of the two and can function in the effects loop or on the front end of any amplification system.

We at TRACE ELLIOT consider that one battery of 9 volts does not give sufficient headroom in the circuitry for the peaks in the signal from your instrument, so as not to compromise the signal integrity the SMX PEDAL uses two 9 volt batteries to give an internal power supply of 18 volts.

Connections and controls

Power to the unit is supplied from the two internal 9 volt batteries or from the D.C. SUPPLY socket on the back of the unit (this requires a regulated 18 volts mains adaptor available from TRACE ELLIOT as an optional extra).
Power to the unit is turned on when a jack plug is inserted into the INPUT socket.



Two LED's indicate the ACTIVE status of the unit, these are EFFECT ACTIVE above the OUTPUT control to indicate when the effect is switched into circuit, and HI COMP ACTIVE to indicate when the HIGH COMPRESSION is switched into circuit. This second LED will indicate the status of the HIGH COMPRESSION even when the unit is in bypass mode i.e. EFFECT ACTIVE off, to let you know the current condition of the HIGH COMPRESSION prior to switching the overall effect into circuit i.e. EFFECT ACTIVE on.
If either of these LED's should start to become dim then it is time to replace the batteries.

Input control

The INPUT control is to allow you to set the input sensitivity of the unit to your instrument, if this is not set to the optimum level then you will not have full use of the compression range available.

With your instrument plugged into the SMX PEDAL and its own level control turned up full play a few loud notes. Gradually increase the setting of the INPUT control, the INPUT LEVEL LED should start off showing GREEN as you play and eventually turn to RED as the INPUT control is increased. The optimum setting for this control is when the LED shows GREEN for every note played with an occasional flick into the RED on loud peaks.

Compression

TRACE ELLIOT have always avoided including compression in any of their previous amplifiers as the integrity of the bass signal has always been paramount in all designs.The reason for this is simply that any kind of FULL RANGE compression used on bass is always an unacceptable compromise. It cannot act fast enough to catch attack transients, and if it does then it distorts low frequency signals. If you have used any full range compression then you know what we mean.

The compression within the SMX PEDAL has therefore been split into two entirely separate compressors, one optimised for LOW frequencies and one optimised for HIGH frequencies, both individually adjustable by the user.

Separate attack and release characteristics are used for the HIGH and LOW compression, fast for the HIGH and medium to slow for the LOW. Fast is needed on the HIGH compression in order to catch initial high frequency transients on striking the string, if however this speed of attack is used for the LOW compression it produces distortion on low bass notes. If the slower attack is used on the high frequencies any initial transient will get through unchecked and subsequent transients will disappear as the low bass compression would not have had time to recover, i.e. the release is too slow for the high frequencies.

Low compression

The LOW frequency compressor acts upon the low pass signal only.
Applying the compression to the LOW PASS gives a fat bottom end to the sound without losing the upper frequency attack characteristics of the note. It is somewhat of a less processed sounding effect than full range compression but works extremely well in smoothing out bass signal peaks allowing a far greater volume of amplification to be used without the risk of speakers flapping.
You will also find a degree of LOW compression will add definition to your playing, bringing out the notes within a run without loss of the upper dynamics.
As the compression control is advanced and compression is applied to the signal the overall level of volume is compensated for, if this were not done then adding compression would have the effect of reducing the volume of the sound as the available dynamics are reduced.
The compression within the SMX PEDAL has been added as a means of creatively modifying your bass sound and as such becomes part and parcel of the overall sound character that you create, and not merely as an effect.
By turning either compression control to its fully anticlockwise position removes all compression from the sound without significantly altering the overall volume.

High compression

The HIGH frequency compressor acts upon the high pass signal only.
The HIGH COMPRESSION should be used with care as it is directly affecting the attack portion of the bass sound, this can be used to good effect but moderation should always be exercised when applying the high compression.
As the compression control is advanced and compression is applied to the signal the overall level of volume is compensated for, if this were not done then adding compression would have the effect of reducing the volume of the sound as the available dynamics are reduced.
However in the case of the HIGH compression circuit this means that when no signal is present then additional gain is added at high frequencies. The more the compression control is advanced the more additional gain. This in itself presents no problem as the electronics within the SMX produce very little noise. However if

you are using an active bass you may well find that adding high compression adds significant levels of HISS to the sound, this HISS is coming from the active electronics within your bass, this can be proved by unplugging the instrument from the SMX input socket, and the HISS goes away.
Using a passive bass with the SMX will produce none of these problems.
The two compression circuits can be set individually to produce some useful sounds, i.e. with LOW set to about half to tighten up the bottom end of the sound, the HIGH can be varied in conjunction with the EQ BALANCE control to produce a variety of different attacks to the note to suit many different styles of playing.

EQ balance

This is an entirely new concept in terms of a means of EQ adjustment.
The signal entering the SMX PEDAL is a full range mono signal, this is then split into two with one part containing the HIGH PASS (upper frequency) content of the signal and the other part containing the LOW PASS (lower frequency) content of the signal.
Both parts pass through their own separate compression circuitry and then on to the EQ BALANCE control. Here they are re-combined into a single full range signal once again that contains a mix of the HIGH and LOW frequencies in proportion to the setting of the EQ BALANCE control.
As can be seen from the diagram, the EQ BALANCE control varies between HIGH and LOW and is FLAT in its centre position.
The action of this control can be envisaged by imagining a pivot point at the centre of the frequency spectrum of your instrument about which the EQ of the instrument can be swung.
Turning the EQ BALANCE control to the right increases the top end and decreases the bottom end, while turning it to the left decreases the top end and increases the bottom end.
The internal filter circuits that feed this control have been designed to allow the HIGH PASS and LOW LOW PASS signals to overlap in frequency so that fully LOW or fully HIGH may be used as individually useful sounds in their own right i.e. with the EQ BALANCE control set fully LOW PASS there is still enough higher

frequency content in the sound to make it useful. The opposite being true when the EQ BALANCE control is set fully HIGH PASS.
In this way the EQ BALANCE control can vary between a full heavy bottomed reggae bass sound at one extreme of its range through a flat setting in its centre position to a bright and hard slap sound at its other extreme. All these sounds may be used with or without HIGH or LOW compression, set precisely to your needs. Whether or not you understand its action, you will find the EQ BALANCE control a very easy and flexible way to instantly modify your sound over a wide range.

Output control

The OUTPUT control is to set a balance between the levels when the effect is switched in or out, this can be used in two ways by either adjusting it to give the same overall level but just the addition of compression or EQ when switched in, or to give a level boost when the effect is switched in.

Connection within your system

The SMX PEDAL can be used IN LINE on the front end of your system with your instrument plugged directly into the INPUT and its OUTPUT taken to the input of your amplifier, or if you have an effects loop it may be used connected into this loop.
If you are already a TRACE ELLIOT user and you are adding the SMX PEDAL to your system then you will find the results will be different between using the SMX PEDAL on the front end and in the effects loop. The reason for this is that on the front end the SMX is working prior to the EQ (the graphic and mid pre shape) whilst in the effects loop it is actually placed after the EQ, you may want to experiment with both methods to discover which you prefer.

Replacing the batteries

When either of the ACTIVE LED's start to become dim or the INPUT LEVEL LED starts to show an orangy red most of the time then it is time to replace the batteries.
The access to the batteries is through the bottom plate of the unit, by removing

the one small screw that secures the battery cover plate in position. Lift the battery body from the outside edge of the unit to remove either battery.
Always replace both batteries at the same time and when inserting the new batteries observe the polarity of each one by referring to the diagram printed on the bottom of the unit just above the battery compartment.
For maximum life always use high power type batteries, this should then give you useful working life of approximately 75 hours. Remember to always unplug the INPUT jack to the unit when not in use to conserve battery life.
An AC mains adaptor is available for the SMX PEDAL, this is a special 18V regulated DC unit and is available from TRACE ELLIOT as an optional extra. Do not use any other AC adaptor to power this pedal.

Technical specifications

High pass filter section

Filter type	Butterworth
Filter frequency	225Hz
Filter roll off	12dB/octave
Filter damping	1.4

Low pass filter section

Filter type	Butterworth
Filter frequency	900Hz
Filter roll off	12dB/octave
Filter damping	1.4

Composite crossover point of the overlapping High and Low pass filters = 350Hz

High compression

Attack time	1mS
Decay time	70mS
Max comp ratio	8:1

Low compression

Attack time	22mS
Decay time	122mS
Max comp ratio	8:1

Input

Impedance 250k Ohms
Signal level 600mV nominal, 6v max.

Output

Impedance 15k Ohms
Signal level nominal level 600mV

Supply

Internal	18v from 2, 9 v batteries (MN1604)
Average load	6.5mA
Max load	10mA
Average life	75 hours
External supply	18v DC adaptor. Centre pin negative.