THERMIONIC CULTURE

THE PHOENIX

valve compressor

OPERATING MANUAL



WARNING

For your personal safety, please read this operating manual and warning thoroughly before using the equipment.

This unit must be installed in such a manner that operator access to the mains plug is maintained. Where the product is to be rack mounted, this may be achieved by having access to the disconnection device for the whole rack.

To reduce the risk of electric shock, it is essential that the unit is disconnected from the mains supply before removing the cover.

Please also note that the power supply capacitors within this unit can remain charged even after the mains supply has been disconnected. It is essential that these capacitors are discharged after the mains supply has been disconnected and the covers have been removed.

In the event that this unit has been dropped or has suffered an impact, an electrical safety test must be carried out before reconnection to the mains supply.

This equipment is not intended for use in explosion hazard environments. It must be used and stored in studio conditions, such that the ambient relative humidity does not exceed 80%, nor is the temperature to be allowed to drop to a level, which would cause dew point to be reached.

Please ensure that adequate ventilation is provided and that the ventilation slots are not obstructed. When rack mounting this equipment, a fan may be required to provide sufficient airflow.

NOTE: When switching on from cold ensure that the STANDBY switch is in the UP position (red light on). Leave for at least 20 seconds before switching down for normal operation. See section 2.

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1 Introduction

The Phoenix is a stereo compressor which can be used as a pair of mono compressors. It has a ‘soft knee’ or ‘variable mu’ characteristic in that the compression ratio increases with the amount of compression being used. Initial compression is 1.2:1 increasing to 5:1 at 15dB compression.

The Phoenix is being updated continually and this unit is the ‘2011/12’ version (suffix QSB) with sidechain filter and standby switch.

The sidechain works by filtering out bass frequencies from the compressor's detector circuit and this makes the compression less sensitive to the low frequencies present in the audio signal.
It is due to the nature of bass frequencies that this is a desirable effect. Bass frequencies tend to contain a lot of the energy present in a full band signal and large fluctuations in the amplitude of these frequencies can tend to dominate the performance of the compressor.
A classic example is found when using a compressor over the mix buss. If the music contains a bass instrument that is not in all the way through the mix, it is noticeable that the overall volume of the other instruments in the mix can go down when the bass instrument is introduced. This is especially noticeable when using heavy compression.

The sidechain can also be useful on single instrument sources, perhaps a vocal that needs to be dynamically controlled in the mid-range frequencies for example.

Another useful effect of the control is that it is possible to make more use of the faster attack times available on the Phoenix. When the sidechain control is activated the Phoenix will be responding to the higher frequencies. As these frequencies are commonly associated with transient responses it is now possible to speed the attack time of the Phoenix up so that it predominantly compresses these transients.

2 Standby and metering

The Standby switch is provided to extend valve and capacitor life. When the Phoenix is on 'standby' the HT current through the valves is less than 50% of normal. The meters, which read the current through the input valves, will be at about half full scale. Always have the switch up (red light on) when switching on from cold and leave for at least 20 seconds before switching down. Once switched on its best left on all day, but switch to standby if not actually being used. It will come back to normal operation instantly.

When warmed up and settled down off standby, the meters should read '0' for no compression. The meters will vary a little with mains voltage and may drop as valves age. The zeros should be adjusted by inserting the tool provided into the pre-sets between the meters. The meter adjustment does not affect the performance of the compressor so having the meters reading exactly '0' is not critical, but its best if they are the same when compressing a stereo track. The small screws actually on the meters are only to adjust the needle so that it is horizontal when the unit is switched off.

3 Controls & operation

3.1 Output Trim Control

This control is used to trim the output levels when compressing a stereo mix. Its function occurs after the electronics and therefore reduces the maximum output level (MOL) and noise.

For operation at line level (+4dBV), this control is best left at around 7. For -10dBV operation it should be set to 2.

3.2 Gain Control

For line level and medium compression, this control should be set, typically, to between 3 and 5.

3.3 Attack Control

The attack control varies the rate at which the compressor starts to react. Attack rates of between 4ms (fully anti-clockwise) and 120ms (fully clockwise) can be achieved. This control is typically set to 3 for normal operation. Slow attack rates make the compressor less efficient, but can be effective for percussion.

3.4 Release Control

The release control varies the rate at which the compressor ‘lets go’ of the input signal. Release varies from 40ms (fully anti-clockwise) to 2.4s (fully clockwise), typically. Faster release times can give rise to low frequency distortion. A typical setting for normal operation of the release control is 3.

N.B. The compressor will become inefficient if very slow attack and very fast release times are used. However, this can be used to advantage if 'thumping' bass effects are required.

3.5 Threshold Control

The threshold control is used to adjust the amount of compression in conjunction with the input level. With the control in the fully clockwise position, there will be no compression. Turning the control anti-clockwise increases the amount of compression.

3.6 Bypass

This control totally bypasses the compressors, by linking the inputs to the outputs.

3.7 Link

Links the two compressors for compressing a stereo track. All controls are still in use, so both channels should be set to around the same setting. Ideally, a 1kHz tone should be used to setup the levels so that both channels' inputs and outputs are equal. In practice, this is not always necessary.

In another application, the link control can be used to allow one compressor to control the other in a mono application. For example, to increase the high end compression, use the channel 1 compressor as the signal path and feed an equalised version of the same signal with additional top lift into channel 2. Turn off the compression to channel 1 by turning the threshold control fully clockwise. The opposite applies to

channel 2. Channel 2 controls channel 1 when link is in.

3.8 Sidechain

The sidechain filter operates only on the control voltage part of the Phoenix, it is not in the signal path so no audio that you will hear has passed through it.
The sidechain filters operate as high pass filters operating at either 150Hz or 300Hz. This is denoted by the symbols for high pass filtering on the control.
In use the filters will alter the response of the Phoenix to bass frequencies. The compression will become less responsive to bass frequencies either below 150Hz or 300Hz, depending on the position of the switch.
It's worth noting that as the Phoenix has a true stereo link, it is possible to set the sidechain control in a different position on each channel. The result will be an average of the two settings when in link mode. So if channel 1 has a sidechain control set at 150Hz and channel 2 has a sidechain control set at 300Hz,, the overall sidechain response will be a high pass filter at 225Hz.

4 Servicing & Maintenance

The unit comes with a 12 month warranty covering all parts, including valves. It is essential that it is returned to our factory or to the dealer from which it was purchased for repairs to be carried out otherwise the warranty is invalidated. There is, however, one important exception to this rule:

4.1 Valves

It is quite safe for the user to change the valves, but **the unit must not be operated without all valves plugged in**. If a fault occurs, it may be a valve, so **unplug the mains** and remove the top cover.

Looking from the front of the unit there is a row of 4 valves going from left to right and 2 smaller ones at the back. Going from left, the 1st 2 are input/compression, the next 2 are output. The 2 at the back are in the side chain and almost never give any problem. If a fault occurs on 1 channel try swapping the 2 input valves over and if the fault (usually crackle or level loss) changes side then you have located the problem. If not, replace the valves where they were and do the same with the output valves. Make sure that the valves are put back in their original positions.

If a valve fault is located Thermionic Culture will replace, under warranty if applicable. If an input valve (PCC 85) is faulty, BOTH must be replaced as a matched pair and they will be matched at our factory. If an output valve is faulty, then the faulty one can be replaced on its own, though it may be best to replace both if more than 2 years old. Output valves must be accurately matched so that the 2 halves of the valve are equal, then soaked and re-tested. We do this with all valves supplied.

Input valves can be just plugged in and used with the zeros re-adjusted. The output valves have a more complex procedure, details of which will be supplied with the new valve(s) if requested.

4.2 Operating voltage / Fuses

The Phoenix Valve Compressor is factory set to operate from a 230V 50/60Hz AC mains supply It can be set to operate from 115V AC by sliding the voltage selector switch on the rear panel to the '115V' position.

NOTE: If the mains supply voltage is reduced to 115V, then the mains fuse MUST be increased to 1.6A in accordance with the following table:

Operating Voltage	Fuse Rating
115V	T1.6A 20mm type
230V	T800mA 20mm type

5 Specification

Max. o/p level (MOL):	+19dB into 600Ω +24dB into 10kΩ
Max gain:	36dB.
THD (at no compression):	better than 0.06 % @ 100Hz & 1kHz
Noise, IEC weighted:	better than 100dB below MOL.
Input impedance:	15kΩ.
Frequency response:	<1dB variation over range of 12Hz to 56kHz.
Attack time:	0.004s to 0.12s
Release time:	0.04s to 2.4s
Output impedance:	600Ω

Distortion will increase with compression, typically 0.2% & 0.25% at 1kHz & 100Hz with 8dB compression. Attack and release controls are somewhat interdependent, for instance a change of attack setting may affect the release time slightly. Therefore, no times are given on the front panel.

VALVE COMPLEMENT (2 ea):

Input/Compression:	PCC85 (equiv. 9AQ8)
Output:	ECC81 (equiv. 12AT7, CV4024)
Side chain detector:	EB91 (equiv. 6AL5, CV4025).

Thermionic Culture Ltd., Harlow, Essex, UK
Tel: +44 (0)1279 414770 email: technical@thermionicculture.com

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