

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.

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## 1 Introduction

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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 '2009' version (suffix QSC) with sidechain filter.

The sidechain works by filtering out bass frequencies from the compressors 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 Controls & operation**

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### **2.1 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.

### **2.2 Gain Control**

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

### **2.3 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.

### **2.4 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.

## **2.5 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.

## **2.6 Bypass**

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

## **2.7 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.

## **2.8 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.

## **2.9 Pre-sets**

There are four pre-sets accessible above the compressor chassis. The two just behind the front panel controls are to adjust for minimum low frequency distortion. They are set up with an oscilloscope for minimum distortion and phase shift at 40Hz. These pre-sets should not be adjusted, unless the valves are changed.

**The two pre-sets behind the meters are used to adjust the zero points of the meters. They can be adjusted with a long thin screwdriver, without removing the top cover of the compressor. Zero readings will vary a little with mains voltage and valve**

ageing. The zero setting is not critical, but both must be the same if compressing a stereo track.

There are two further pre-sets under the chassis. These are factory set and **must not** be re-adjusted, except by a qualified engineer in possession of full service information and the correct test equipment.

## **2.10 Meters**

The Phoenix can operate much faster than the meters will read.

The meter scales should be used as a guide. Actual compression will vary slightly with individual valves and the meters may not be accurate at high readings.



### **3 Servicing & Maintenance**

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#### **3.1 Valves**

All valves are selected to ensure that the unit gives optimum performance. Input valves are always matched when the unit is calibrated to ensure consistent performance across both channels.

Although Thermionic Culture Ltd guarantees the valves for twelve months, they can last for up to twenty years.

Spares can be obtained in matched pairs from Thermionic Culture Ltd.

#### **3.2 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

## 4 Specification

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Max. o/p level (MOL):	+19dB into 600Ω +24dB into 10kΩ
Max gain:	30dB.
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).

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