

# **P4DMS Excalibur Compressor**

## **By Foote Control Systems**

The P4DMS Excalibur was conceived to be a multi-purpose compressor useful in a number of situations that include mixing, mastering and submix bus applications.

The audio path of the Excalibur was meticulously handcrafted using the finest available analog components, featuring Foote Control Systems custom transformer coupled inputs and outputs in balanced I/O mode. It utilizes high quality laser trimmed VCAs. The Excalibur comes fitted with FCS Class A discrete op amps and FCS custom transformers, the 2781 nickel core input transformers and the 2768 Litz wire wound output transformers.

The 2768 Litz output transformers offer a solid and pure low frequency response and silky high frequencies.

The audio path of the Excalibur is very short.

Input > Input transformer > VCA > I to V amplifier > discrete op amp > output transformer > output.

The Excalibur also features a purist non balanced audio path which can be selected from the front panel. The audio path is even shorter.

Input > VCA > I to V amplifier > output

The Excalibur also features a high quality blend circuit based on high a quality summing circuit. The Blend circuit is available in the Balanced I/O mode, and is not used in the SE I/O (un-balanced) mode.

## **Using the P4DMS Excalibur**

Like any sophisticated piece of audio equipment, the Excalibur takes a little bit of time for users to familiarize themselves with its capabilities and myriad ways to treat audio signals.

A good place to start is what we call "Classic Mode", which is outlined below:

- 1- Put the unit in linked or stereo mode by enabling the switch on the far right of the front panel. Now the left channel of the Excalibur is in control of the compressor. All instructions in "Classic Mode" are referring to the left channel controls since the right channel controls are disabled in linked stereo operation.
- 2- Push the RMS pushbutton, being sure no other pushbuttons are

**\*\*Note that the Attack and Release knobs are disabled in "Classic Mode"\*\***

**3- Set the Threshold knob to around 12:00**

**4- Set the Ratio knob to around 10:00**

**5- Set the Gain knob to around 2:00**

Connect the Excalibur to your audio source, a CD player or mixer output, and play some audio.

You should be seeing some amount of activity on the Gain Reduction meter. Now rotate the Threshold knob until you see around 6dB of G/R, which is approximately 6 LEDs illuminated in the meter with the meter set to 10dB. Now, you can adjust the "makeup gain" with the Gain knob, using the bypass pushbutton (Bypass) to compare the compressed signal level with the raw signal level.

## **HP Mode notes**

After you have become familiar with the general "feel" and sound of "Classic Mode" try pressing the "HPF" pushbutton while listening to the signal. The frequency of the HPF is adjustable from the HPF frequency switch on the front panel.

On full range material you will notice that the character of compression "relaxes" slightly, letting more detail through. This is because low frequency content is contributing less to the control signal that tells the VCA how much to compress the audio signal.

Many users have found the "HPF" function to be really helpful when processing electric bass, guitar and kick drum submix or room mic tracks, allowing more of the dynamic qualities of the player's style to come through while still compressing the overall sound.

## **NL Mode notes**

"N/L" stands for the non-linear capacitor circuit, which provides the Excalibur with a very fast attack and release for short transient sounds, and a longer attack and release for slower waveforms. This function is similar to effects that can be had on the Valley 610 dynamics processor and also similar to the "Nuke" mode of the Distressor dynamics processor.

This is usable when you want heavy peak limiting, as the timings are fast enough to facilitate peak limiting.

Another creative use of the NL is over-compressing drum tracks using the "N/L" function.

You will notice that this effect is rhythmically dependent and works on some

material very well and not as effectively on other material. But when it comes together, you can almost erase the drum track leaving only ambient room sound at the output.

## **Over-compression notes**

In extreme amounts of compression, you will notice that the Gain knob will not bring the output level back to unity if more than 11.5 dB of G/R is in use. If you need more level during extreme compression, you can use an external preamp. Just be careful when doing this since depressing the "Bypass" pushbutton can result in huge volume jumps that can damage speakers and other equipment.

## **Compressor Controls**

The Excalibur panel can be broken down into 7 major groups of objects:

### **1- Rotary controls**

"Attack" control varies the attack time of the compressor when the AR pushbutton is pressed. (CCW for shorter attack, CW for longer attack)

"Release" control varies the release time of the compressor when the AR pushbutton is pressed. (CCW for shorter release, CW for longer release)

"Threshold" Control varies the compression threshold between -30 dB and +15 dB @ 8:1

"Ratio" control varies the amount of compression between 1:1 to 8:1

"Gain" control ranges from 0dB at the CCW extreme to 11.5 dB at the CW extreme.

"HPF frequency" sets the operating frequency of the pre detector HPF

"Blend" sets the output mix between wet and dry while in Balanced I/O mode.

### **3- Meter Range pushbutton switch**

When this pushbutton is out, the GR meter has a range of 0 – 10 dB in 0.5 dB steps.

When this pushbutton is in, the GR meter has a range of 0 – 5 dB in 0.25 dB steps.

### **3- Time constant pushbutton switches**

The "A/R" pushbutton enables the "Attack" and "Release" controls when pressed.

The Attack control has a range of 1.5 ms to 150 ms at 10 dB of compression  
The Release control has a range of 15 ms to 750 ms at 10 dB of compression  
**\*\*Note that the AR timing circuit operates in the peak domain\*\***

The "N/L" pushbutton enables the "non-linear capacitor" circuit when pressed for automatic adaptive compression.  
**\*\*Note that the NL timing circuit operates in the RMS domain\*\***

The "RMS" pushbutton enables the fixed RMS timing feature when pressed.

These functions are available at all times simultaneously and can be mixed for unique and unusual compression types.

## **4- Sidechain control pushbutton switches**

The "F/B" pushbutton sets the topology of the compressor to feedback when pressed. When this switch is out, it is in feedforward mode. While in feedback mode you will notice that the Gain knob now has influence on the ratio of the compressor, as it is interactive with the Ratio knob.

The "HPF" pushbutton enables a variable frequency high pass filter into the sidechain when pressed to prevent low frequency content from dominating the compression. The HPF frequency selector is for complete control over detector behavior with respect to low frequency sensitivity over a wide range.

The "EXT" pushbutton activates the balanced stereo side chain XLR inputs.

## **5- SE I/O**

This toggles the Excalibur's I/O to the non balanced, SE I/O when depressed

## **6- TPS Link**

This switch puts the Excalibur in linked stereo mode. The left channel controls all compressor functions except for HPF frequency, SE I/O and Blend. These controls are always in separate control mode, not affected by the TPS Link switch

## **7- Bypass**

> "Bypass" pushbutton bypasses the compressor when in the in position,

which also fires an LED to let you easily see that the channel is bypassed.

## **Operational and behavior notes**

- 1- The blend control is a true summing amplifier and it adds 5dB to signal level in the 50/50 (12:00) position.**

**This is not really obvious unless you are listening to test tones, as complex audio masks this effect.**

- 2- GR vs signal level in Balanced and SE I/O modes.**

**In Balanced mode, a 1 kHz @0 dB tone yields 15 dB of gain reduction (GR)**

**In SE mode, a 1 kHz @0 dB tone yields 17 dB of GR**

- 3- In Ext Side Chain mode, we are using a separate, balanced audio path. The SC outputs on XLR Male connectors, is the same as the input signal, except that it adds 4.5 dB to the level of the main input.**

**In balanced operation, the external SC input will exhibit 1.5 dB more GR than the internal side chain.**

**In SE operation, the external SC input will exhibit the same GR as the internal side chain.**

- 4- When using the compressor in TPS Link (True Power Sum), the compressor is mainly controlled by the left channel only. The exceptions to this are the HPF frequency switches, the SE I/O switches and the Blend controls, which stay "Per channel" functions. Those controls are not linked by the TPS link switch.**

# **P4DMS Excalibur Stereo Compressor Features**

- > All analog audio path**
- > Fully balanced audio I/O on Neutrik XLR connectors**
- > Non balanced purist audio I/O on Neutrik TRS connectors**
- > Foote Control Systems custom 2781 input and 2768 Litz wire wound output transformers**
- > Foote Control Systems discrete, Class A op amps**
- > Elma 24 step switches on all rotary controls except the HPF frequency switch**
- > Goldpoint mil spec rotary switches on the HPF frequency controls**
- > Gold plated switch contacts**
- > RMS Mode that uses the human ear's responses as a compression model**
- > A/R Mode that allows the user to custom tailor attack and release times**
- > N/L mode that automatically adjusts time constants using program material content**
- > A variable frequency high pass filter before the detector to limit how much low frequencies contribute to overall compression shape**
- > Threshold range from -30 dB to +15 dB**
- > Ratio continuously variable from 1:1 through 8:1**
- > Makeup gain range from 0 dB to +11.5 dB**
- > Fast LED metering to display the gain reduction of the compressor in 2 ranges, 10 dB and 5 dB**
- > Blend control to control the balance between processed audio and un-processed audio. It is known as a "Wet/Dry" control on some processors.**
- > Maximum output level of +22 dBu**

## **Balanced I/O specifications**

**> Frequency response:**

**+0.07 dB @ 20 Hz**

**-0.59 dB @ 20 kHz**

**3 dB down point 40 kHz**

**> Noise level**

**-95.5 dBA**

**> Dynamic range**

**95 dBA**

**> THD**

**0.013%**

## **Non Balanced I/O specifications**

**> Frequency response:**

**+0.03 dB @ 20 Hz**

**-0.30 dB @ 20 kHz**

**3 dB down point 40 kHz**

**> Noise level**

**-94.1 dBA**

**> Dynamic range**

**94.1 dBA**

**> THD**

**0.01%**

**> Power consumption: 45W max @120V - 240V AC**

# Warranty

The P4DMS Excalibur Stereo Compressor is warranted to be free of manufacturing defects for a period of 1 (one) year from the date of purchase to the original purchaser only.

This warranty covers all parts and labor but does not cover shipping.

Failures due to accidental damage, being exposed to the elements, natural disaster are NOT covered by this warranty.

If your unit needs service, please contact Foote Control Systems or Retro Gear Shop for more information.

You will be asked to provide a copy of the invoice when warranty work is requested.

The P4DMS Excalibur design, panel, board layout, all drawings and all documentation copyrighted Roger Foote (c) 2005-2023

Any real or imagined damage due to the use of this product are the responsibility of the end user, not Foote Control Systems, FCS or Roger Foote

Foote Control Systems retains the right to modify or improve this design without notification of any kind.

Designed and built by:  
Foote Control Systems  
PO Box 98  
Hayfork, CA 96041-0098  
USA