

PUNISHR

Analogue Harmonic Distortion Module

Malcolm Toft

User Manual

www.malcolmtoft.com

made in England

© Malcolm Toft

www.malcolmtoft.com

As research and development is a continual process, Malcolm Toft reserves the right to change the features and specifications described herein without notice or obligation.

Malcolm Toft cannot be held responsible for any loss or damage arising directly or indirectly from any error or omission in this manual.

E&OE
June 2022

PUNISHR

- Analogue Harmonic Distortion Module
- 4 Tonal Shaping Processing Paths
- 3 Different types of distortion : SYM, ASYM and IRON
- SYM : Symmetrical distortion - where both sides of the waveform are clipped
- ASYM : Asymmetrical distortion - where only one side of the waveform is clipped
- IRON : Iron Transformer Saturation
- Input Drive LED designed to illuminate when a steady signal (or tone) reaches 0dbm
- Individual Bypass LED switches and Level control for each Distortion Circuit
- Automatic gain levelling circuitry
- 1970's inspired shelving EQ at 100Hz and 8kHz
- Sweepable High Pass Filter from 30Hz to 350Hz
- Sweepable Low Pass Filter from 1.5kHz to 20kHz
- Smooth 12db per octave Musical Filter Slopes
- EQ/Filter circuit can be placed Pre or Post the Distortion Circuits
- SUM mode feeds the input to all 3 Distortion Circuits simultaneously
- Overall continuously variable Dry / Wet Mix Control
- Made in UK - Analogue Circuit Design by Malcolm Toft

PUNISHR concept :

The concept of the **PUNISHR** was conceived when the world was in lockdown by **Nick Mitchell** :

“ Producers and Artists showed the way forward with remote sessions and collaborations across the globe - the music never stopped but I just felt something was missing from my production workflow.

We all have access to similar software and plug-ins but the tactile feel of using hardware alongside the human desire for harmonic distortion really does more than glue the sound - it takes you on a journey of experimentation that single click plug-in parameters cannot compete with. I was unsatisfied with software distortion sounding 2 dimensional, I needed that 3D depth.

Could a ‘tonal box’ be created to provide different types of aggressive distortion for mixing/tracking with the control and the flexibility of routing that we get from working with plug-ins?

*I reached out to **James Stone** (at malcolmtoft.com) to discuss ideas and within weeks Malcolm started working on an audio circuit.*

*After the first positive studio listening session we set to task designing a 500 Series module that was tactile and intuitive, allowing the sound of Malcolm’s analogue circuit to be creatively experimented with. We’re very proud of the **PUNISHR**.”*

Nick Mitchell

PUNISHR sound :

The **PUNISHR** analogue circuit has been designed by successful UK console designer and recording engineer **Malcolm Toft** who has over 50 years experience in the recording industry.

As a console designer, he founded renowned console manufacturer Trident Audio Developments in 1973 which became a leading company in the recording industry supplying studios across the world. Creating the sound for : Queen, David Bowie, Genesis, Elton John and countless other artists...

His original Trident consoles are still widely used and are highly regarded for their depth of sound and warmth.

Having spent years designing professional audio equipment to provide the best headroom and lowest noise, the concept of the **PUNISHR** twisted these requirements...but this is not something Malcolm was unfamiliar with as many of his console owners over the years loved the sound of ‘driving his preamps’!

INTRODUCTION

Tonal texture creation is the heart of the **PUNISHR** sound and has the ability to add three different types of harmonic distortion with 4 processing paths.

But that is only the beginning...We hope you enjoy creating sonic mayhem!

Malcolm, Nick and James.

1. DISTORTION

The three types of Distortion are:

- **Symmetrical** distortion where both sides of the waveform are clipped.
- **Asymmetrical** distortion where only side of the waveform is clipped
- **Iron**, where a transformer** is saturated.

**This is quite different to the previous two as saturation of the transformer only tends to occur at low frequencies (typically from below approximately 130Hz).

Each type of distortion therefore has its own sound and characteristic and the **PUNISHR** makes it possible to use any one or a combination of these simultaneously and in individually controllable amounts.

Normally to create distortion, an amplifier (or transformer) is overloaded so that it is no longer able to pass an audio signal without noticeable artefacts (distortion). This is achieved by increasing the level (volume) of the signal passing through the device until the desired effect is achieved.

However, because the signal has to be increased by a significant amount (typically 15-20db), there is a very noticeable increase in the overall signal level. It is therefore necessary to attenuate the signal by a similar amount afterwards in order to restore the signal to its previous level.

This makes it quite difficult to compare the distorted and undistorted signals objectively.

However, the circuits of the **PUNISHR** have been designed in such a way that when any of the three different types of distortion are added and in any amount, **automatic gain levelling circuitry** means that the signal level does not increase at all.

This makes it much easier to compare the original signal with the distorted signal. Each of the three types of distortion also have their own illuminated bypass switch so that their individual effect can be easily compared.

2. EQ and FILTER

The versatile equaliser section has been designed to work specifically with the distortion effects allowing tonal shaping.

First, there is a high and low frequency section with boost and cut of 15db starting at 100Hz for the bass and 8kHz for the treble, also with its own illuminated bypass switch. Use of these controls in conjunction with the chosen type of distortion provides an incredible amount of possibilities.

Secondly, both high and low pass sweepable filters ranging from 30Hz to 350Hz and 1.5kHz to 20kHz respectively, are also provided in the equaliser section.

Again, with their own bypass switch. Used individually, they can provide yet more options for sound shaping. Those options increase yet again when used in conjunction with the high and low frequency controls.

Contained within the equaliser section is another illuminated switch marked 'EQ PRE'. Normally, the equaliser section is placed at the output of the three distortion controls.

However, depressing the 'EQ PRE' button places the equaliser section in front of the three distortion controls (directly after the input), so the signal can be equalised before it goes through the distortion effect. This again can provide yet another range of distortion effects.

3. SUM MODE

Another flexible feature is the 'SUM' button.

Under normal operation, the signal flows in series (one after the other) through the three distortion sections, starting with the **Symmetrical** section, then the **Asymmetrical** section and finally the **Iron** section.

Depressing and illuminating the 'SUM' button feeds the signal to the input of all three sections simultaneously with the single output (summed), then going on to feed the rest of the unit. This once more adds to the versatility and combination of effects that can be generated.

4. IN / OUT

To conclude the array of facilities, there is of course an overall RED illuminated 'IN' button which when undepressed, bypasses overall all of the distortion and equaliser functions.

5. DRY / WET

Finally (and perhaps one of the most important controls), is the 'DRY/WET' function.

This continuously variable control makes it possible in the 'DRY' position to hear the unaffected signal. Movement of the control in a clockwise direction to the 'WET' position, introduces the distortion and equaliser effects that have been added to the signal in proportion to the position of the control.

So in the middle it will be 50% undistorted and 50% distorted and at fully clockwise ('WET') you will only hear the distorted signal.

PUNISHR OPERATION

The **PUNISHR** is a highly versatile piece of audio equipment. There are no hard and fast rules in terms of operation other than to perhaps make sure that the correct signal level is being fed to the input in order for the distortion sections to work at their optimum operating levels around which their unique characteristics have been designed.

Whilst this is not super critical, it is for this reason that a green 'DRIVE' led has been provided which is located just above and to the left of the 'ASYM' control knob.

The led is designed to illuminate when a steady state signal (or tone) reaches 0dbm. So ideally, the incoming signal should be adjusted so that the green led just flashes on and off with the unit bypassed ('IN' button un depressed and non illuminated).

As a suggestion, all pushbuttons should be in their un depressed (non illuminated) mode and all controls set to their default positions.

These are normally anticlockwise for all controls except the high and low equaliser controls which should be in their centre (detented) positions. The exception to this is the low pass filter (1.5kHz to 20kHz) which should be fully clockwise. Otherwise, when it is in circuit, everything will be attenuated above 1.5kHz.

As the unit has so many features, a good approach is to first become familiar with each of the three types of distortion.

Once you have a signal passing through the unit in bypass mode that is illuminating the 'DRIVE' led, depress the 'SYM' 'IN' button (illuminated) and turn the 'DRY/WET' control fully clockwise. You should hear no difference to the sound until you start to turn the 'SYM' control knob clockwise. The more the control is advanced, the more apparent the distortion will become. De-select the 'SYM' mode by undepressing the 'SYM' 'IN' button. Now depress the 'ASYM' 'IN' button (illuminated) and again, turn the 'ASYM' control knob clockwise until this type of distortion becomes apparent and you can note the difference between the two types. Finally, repeat the same procedure to use the 'Iron' control and hear the difference with this type of distortion also.

Set up a particular distortion combination that you like and depress the 'EQ IN' (illuminated button). You can now turn the low and high frequency boost/cut controls and listen to the effect it has on the distortion again in combination with their individual controls and the master 'DRY/WET' control.

Similarly, you can depress the 'FLTRS IN' button (illuminated) and see what effect that has at various settings either in combination with the high and low boost and cut controls or with them either de-selected or in their mid way (flat) positions.

There is no right or wrong way to use the **PUNISHR**. It is very much a case of finding the sound that suits the particular instrument, vocal or complete track that you wish to process.

Once you have become familiar with the controls, the final two facilities to experiment with are the 'EQ PRE' button and 'SUM' button. As explained earlier, the 'EQ PRE' button when illuminated places the entire equaliser section including the filters, before the distortion processors. You can again experiment to hear the difference that it makes to have the equaliser at this point in the signal chain as opposed to the output of the distortion processors.

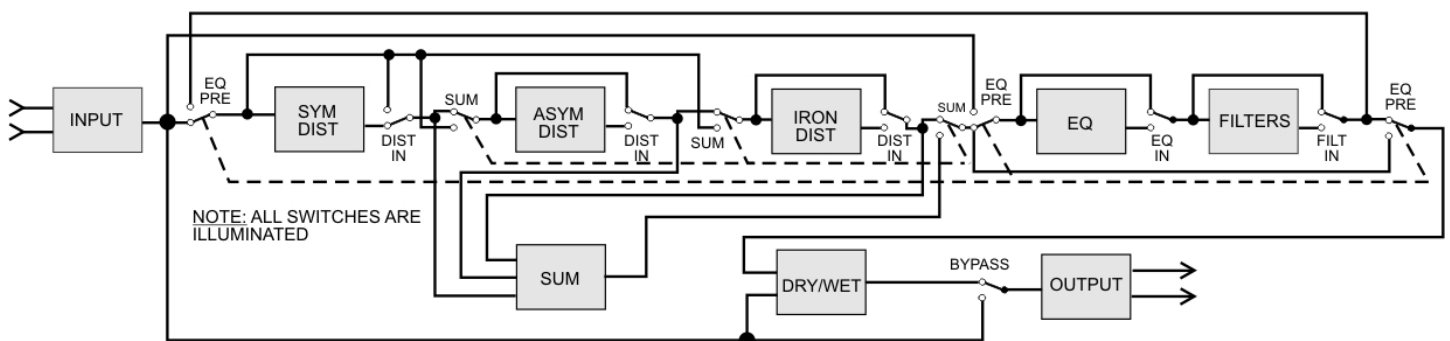
Likewise with the 'SUM' pushbutton, when this button is illuminated, the signal feeds all three types of distortion generators at once as opposed to in series (one after the other).

The difference in this mode is quite apparent and might be very useful in some circumstances.

With the amount of versatility that it offers, it is likely that the **PUNISHR** will find an application in just about any genre of music or on any type of instrument.

Malcolm Joff

PUNISHR SIGNAL FLOW



Thanks to : Charles Rees, Claire Moon, Paul Weller, Blackburn Studios, Claire, Martha and M, Jack Ruston, Gary Bromham, Mark Taylor, Laud Lartey and Tom Shorter.