

# AMTEC DST-5A

## INTRODUCTION

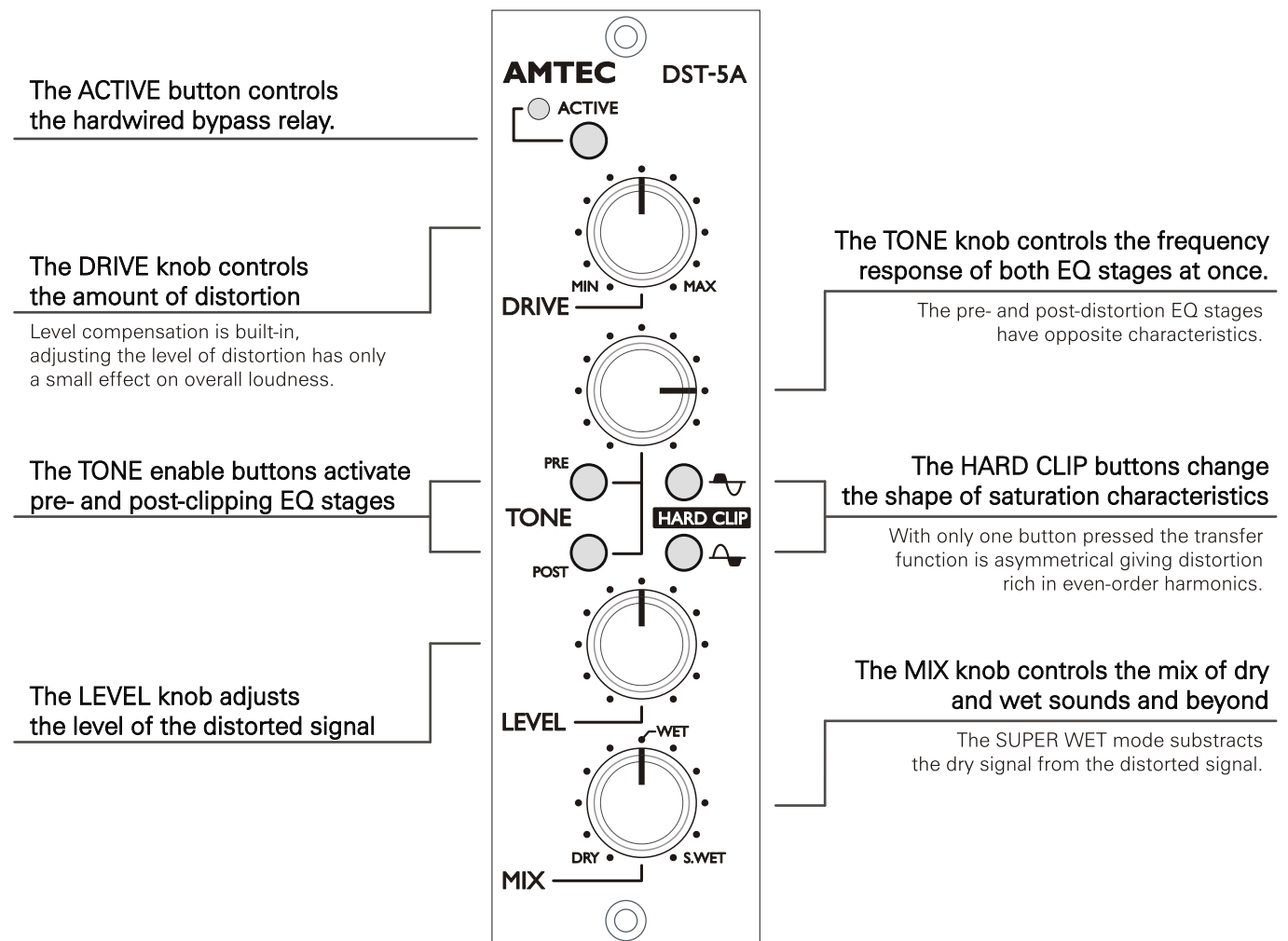
The Amtec DST-5A is a 500-style analogue clipper/distortion module designed to add a controlled amount of harmonic distortion to the audio signal.

It is a line level device that can be used at every stage of audio work (recording/mixing/mastering) on individual tracks of every kind as well as sub-groups or entire mixes.

Its versatility is greatly increased by a choice of 4 different clipping curves, a novel mixing stage and simple, but carefully fine-tuned EQ stages.

The DST-5A offers anything from subtle peak limiting (rounding off the transients and increasing apparent loudness) and tone enhancing that brings out character of vocals, drums, basses, guitars, synthesizers etc. to fully distorting the original tone.

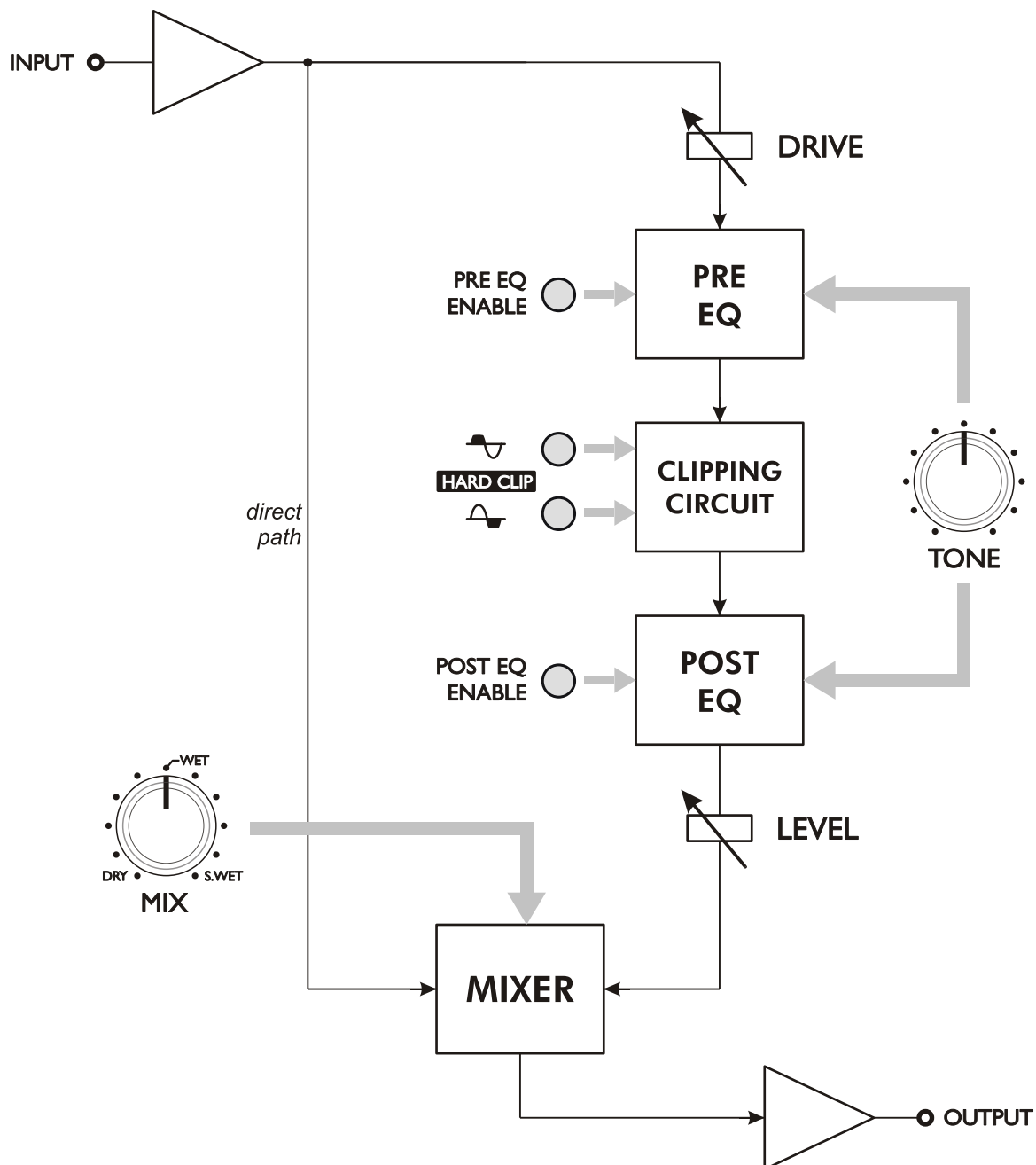
It can be used to simulate the saturation aspect of tape recording, to add crunch, grind and growl with a choice of warm or raspy distortion qualities.



## SIGNAL FLOW

The input stage converts balanced input signal at the line level. The signal is then split into two paths, one of them is the direct path that leads straight to the mixer circuit. The second path consists of two EQ stages and the clipping circuit with gain controls at the input (DRIVE control) and the output (LEVEL control).

The clipping circuit is positioned between the two EQ circuits. Both EQs (pre- and post-distortion) are controlled by one common TONE control with individual ENABLE switches. The EQs, at any given setting of the TONE knob, have completely opposite characteristics. For example, if the "pre" EQ boost high frequencies, the "post" EQ cuts by the same amount at the same frequency, so with both EQs enabled their function is complementary, but allows frequency-dependent saturation.



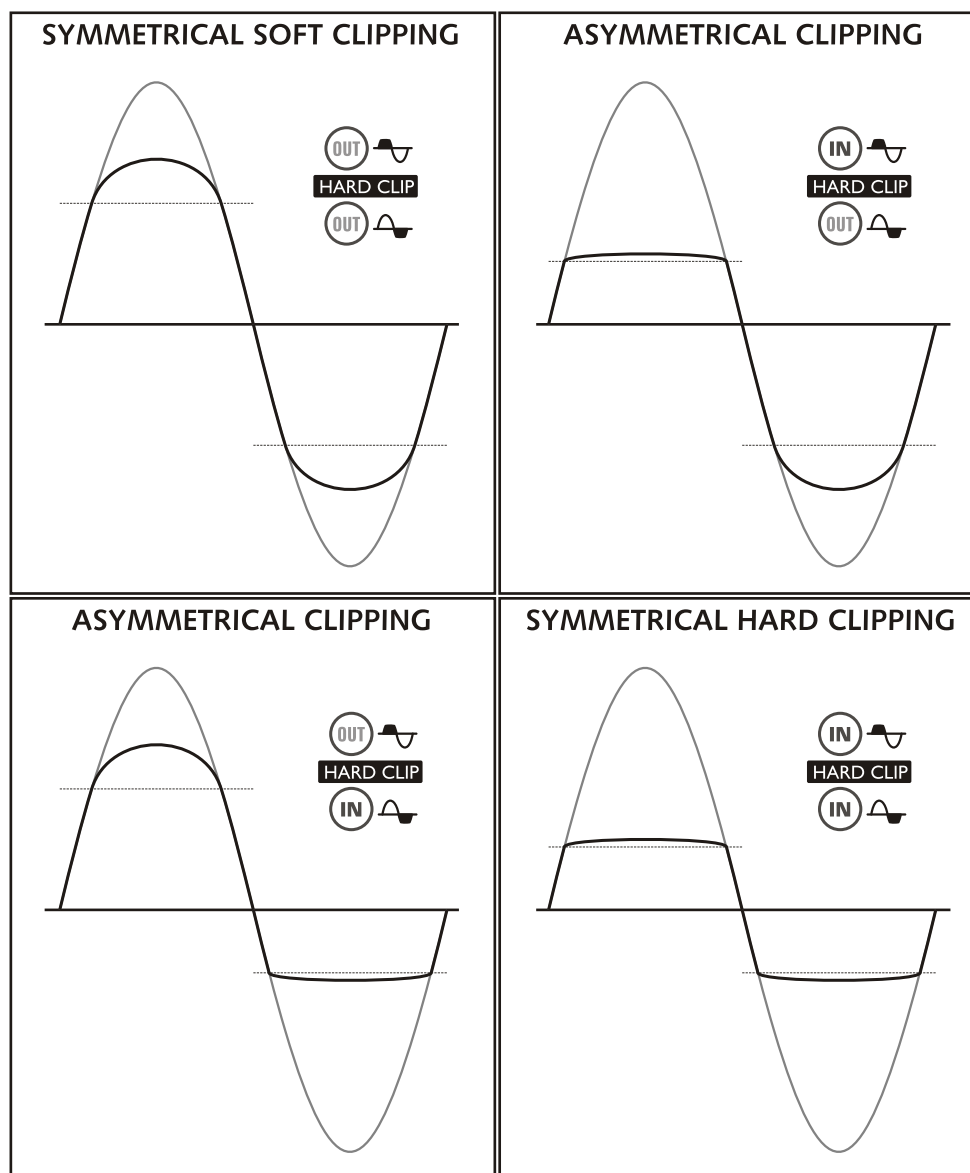
The mixer circuit is unique in that it allows to suppress the dry signal from the distorted signal, leaving only harmonic components produced by the clipping circuit.

The operation of the **MIX** control starts at the counter-clockwise position (**DRY**) with only the direct, non-processed signal routed to the output, it reaches the **WET** position at the middle of the range, where only the distortion path is heard, and then goes to the **SUPER WET** mode which removes input signal from the clipped signal. The **LEVEL** control should be adjusted in that mode for maximum cancellation.

## CLIPPING CHARACTERISTICS

The DST-5A's clipping characteristics (ie. transfer function) are symmetrical and of soft-knee by default, but each half of the input signal waveform can be individually hard-clipped at the level of approximately one-half of the default soft-clip threshold.

The hard-clip function is activated by two push-buttons and their operation is shown on the diagram below:



If only one HARD CLIP button is pushed-in then the clipping is asymmetrical, resulting in increased amount of even-order harmonics produced by the clipping circuit.

With both buttons in the same position the transfer function is almost symmetrical what gives predominantly odd-order harmonics.

Using the hard-clip settings reduce the level coming out of the distortion section and increase the order of harmonics.

The default soft-clip setting is perfect as a peak level controller, as it allows to smoothly round the peaks of the signal processed by the module. It works as a "invisible" peak limiter at lower settings of the DRIVE control, but gets more distorted and audible in higher settings.

## THE EQUALIZATION

The DST-5A has two EQ circuits: one is located before the clipping section and is called "PRE" and the second (after the clipper) is called "POST". Their function is to provide control of the frequency sensitivity of the saturation and the frequency spectrum of the distortion products.

The EQ stages have characteristics controlled by one TONE knob common to both EQs. Also, both EQ stages have individual enable buttons.

The frequency responses of "pre" EQ and "post" EQ are completely opposite - if one of them boosts some part of the frequency spectrum, the other attenuates it. So if both EQs are active then their function completely cancels itself for the signals below the clipping threshold and in the low distortion settings the TONE knob has very little effect on sound. The effect becomes more apparent for larger amounts of distortion, when the TONE control changes the character of the distortion.

Setting the TONE control past the mid position with both EQ stages enabled can be used as a kind of "tape saturation" simulator, as in that position the high frequencies are boosted before the clipping and then attenuated afterwards, hence the smoother tone (the soft-clip setting should be used).

Any or both sections can be bypassed thanks to the enable buttons. Using only one-sided EQ allows for more radical tonal shaping of the distorted signal. Keep in mind that the tonal attributes of the "pre" and "post" sections are opposite.

The graphs below show the frequency responses of the two EQ circuits at extreme settings. In the middle position of the TONE control the frequency response is approximately flat.

