

LOOSE FRUIT

Loose Fruit is a sub-harmonic waveshaper. It creates complex timbres and rich subharmonics. The module features three parts: two wave 'shapers' and a cross-fader for mixing the signals together.

The state knob controls the behaviour of the waveshaper - 9 states blend together as the state changes.

Waveshaper is used here as a generic term - these are not the same type of waveshapers are commonly seen in other modules and devices, rather the waves are shaped by selectively inverting them - see page 2 and 3 for a detailed discussion.

Half speed control is an 'octave down' for waveshaper 1

The state control fades between 9 preset waveshape states

The Out 1 and Out 2 are normalled to inputs left and right

The Xfade CV control is summed with the 'Mix' pot voltage. A CV of approx +/-5V or 10Vpp will pan the Xfade from left to right



The Left waveshaper input is half normalled to the right: if nothing is plugged in to 'In 2', a signal plugged into 'In 1' will be connected to

The CV ins can be used to control the states using a 0-9V CV range

The LEDs turn on when there is a signal on either channel. The colour indicates which state the waveshaper is in.

The Loose Fruits waveshapers are slightly different: waveshaper 1 includes a 'Half Speed' switch, which changes where the thresholds are detected and produces an octave down effect.

Waveshaper 2 has a threshold control, which alters where the point at which the wave is flipped. As the threshold is changed, a pulse width-like sound is produced.

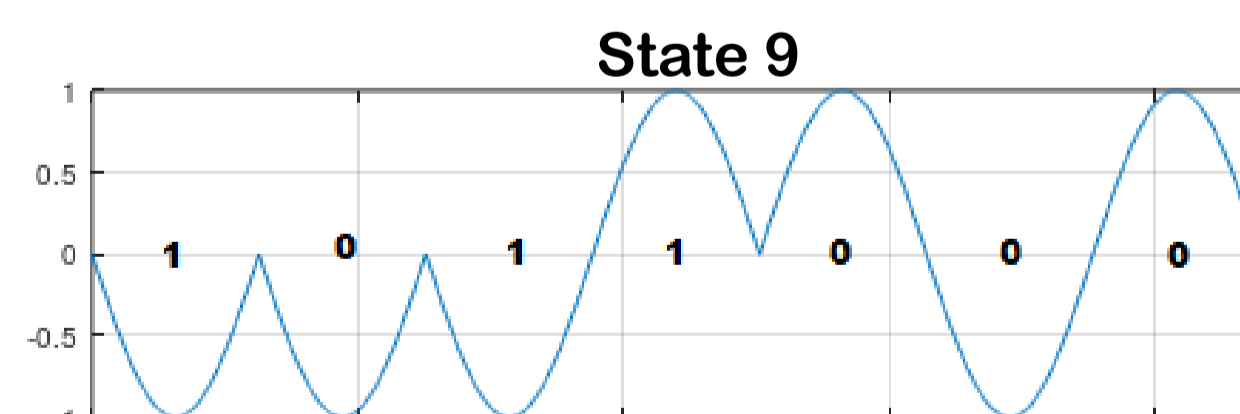
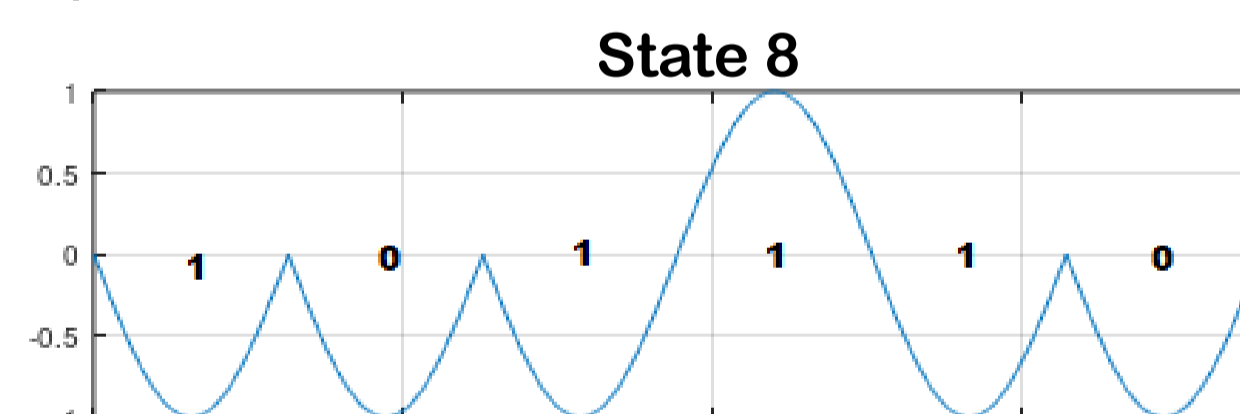
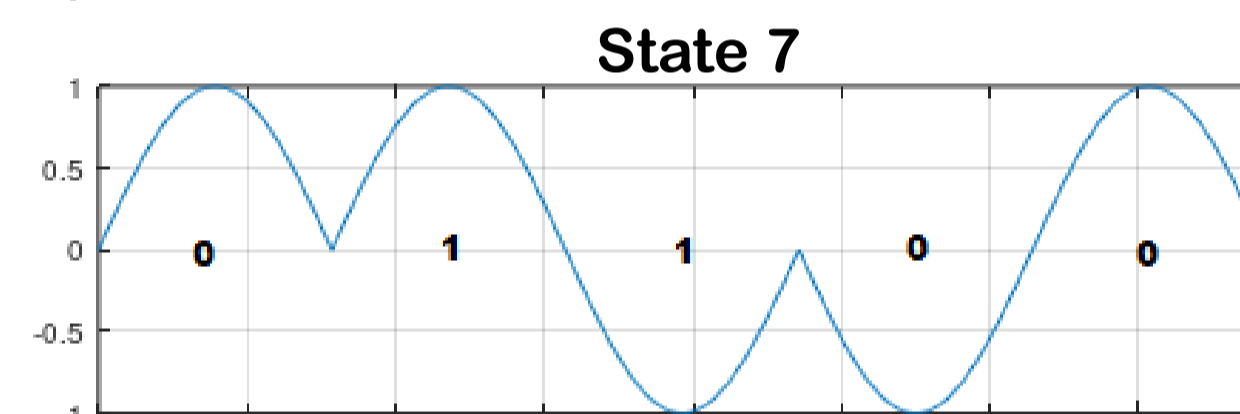
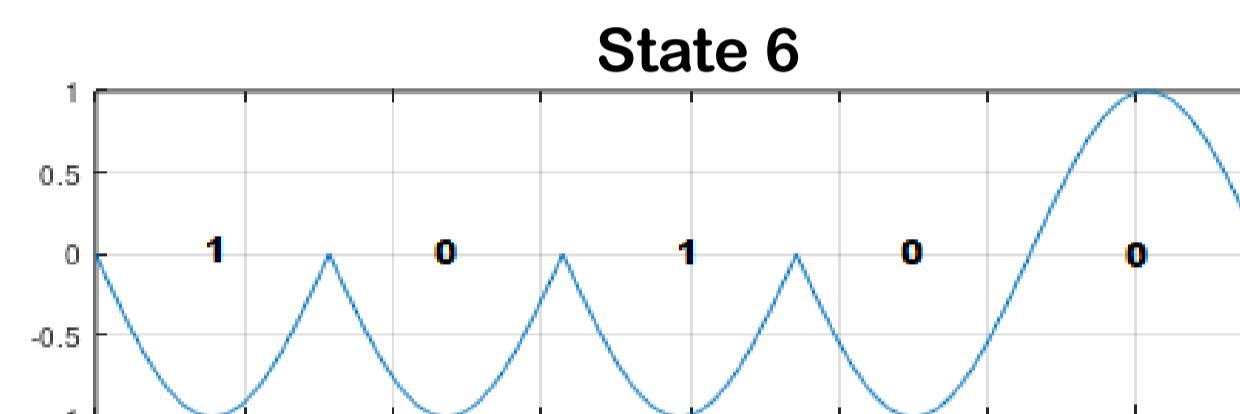
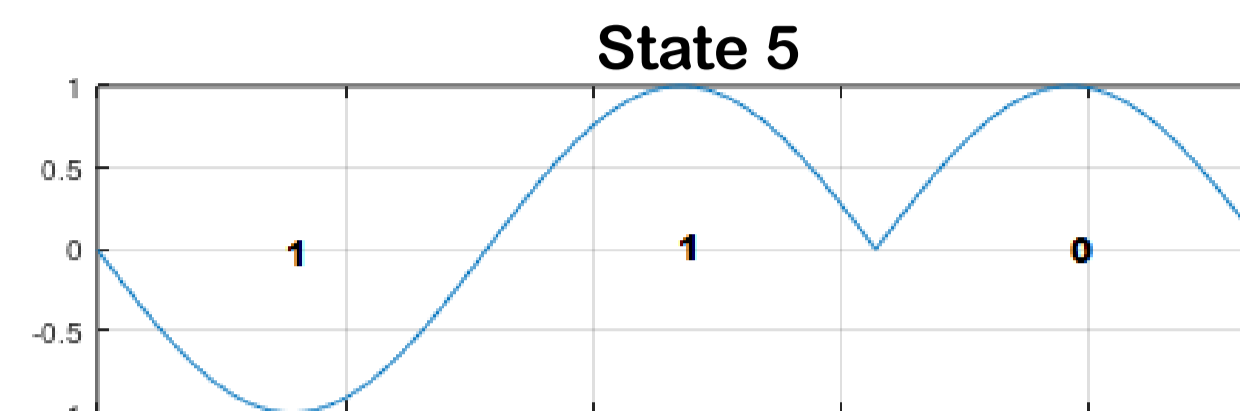
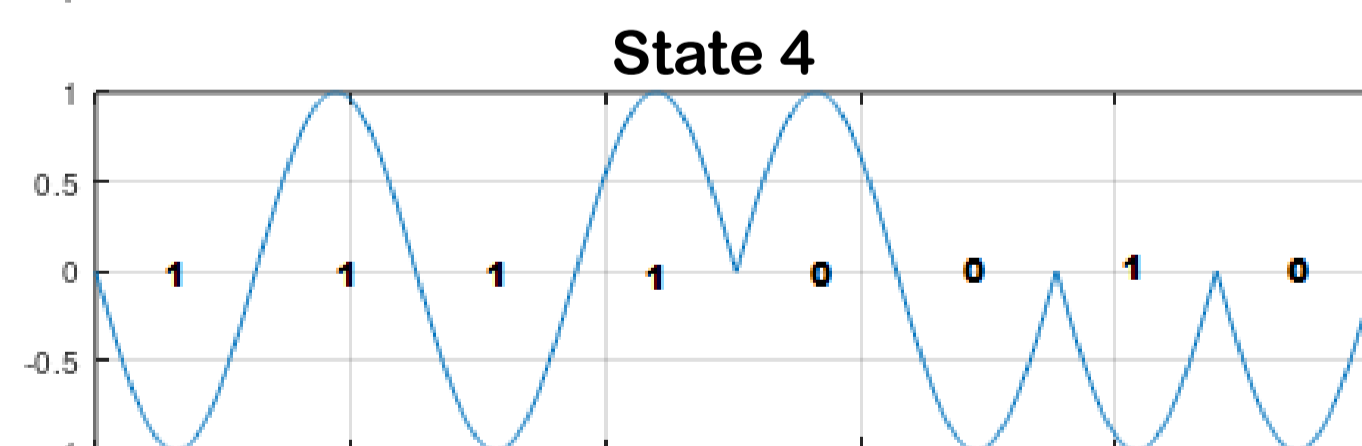
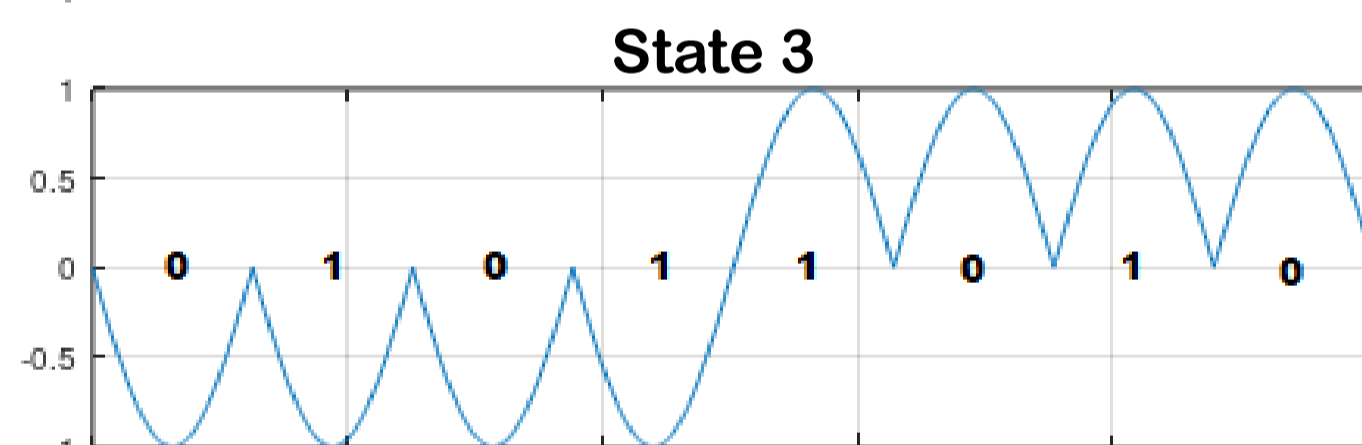
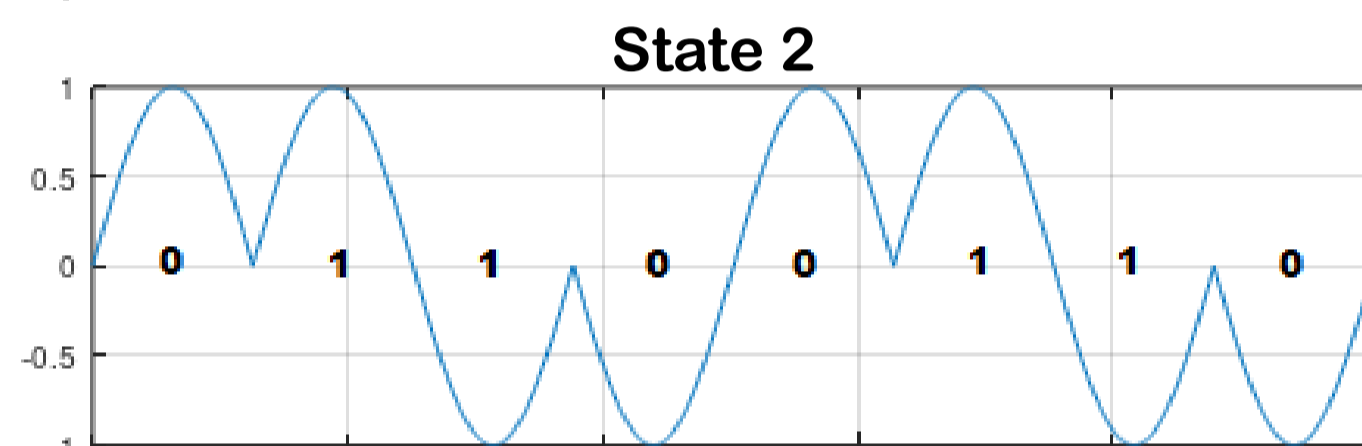
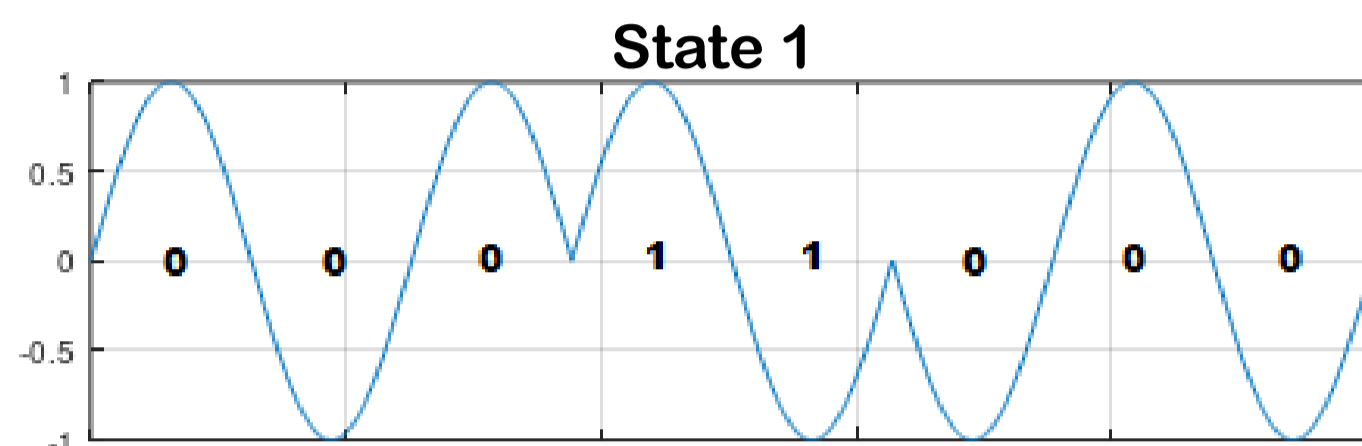
Waveshaper 1 and 2 are designed so that (1) specialises in sub-harmonics and (2) in upper harmonics.

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The two waveshapers in the Loose Fruit work by detecting where the input crosses a threshold and selectively inverting the wave at that point. The first waveshaper's threshold is set at 0. The waveshaper 2 threshold is adjustable.

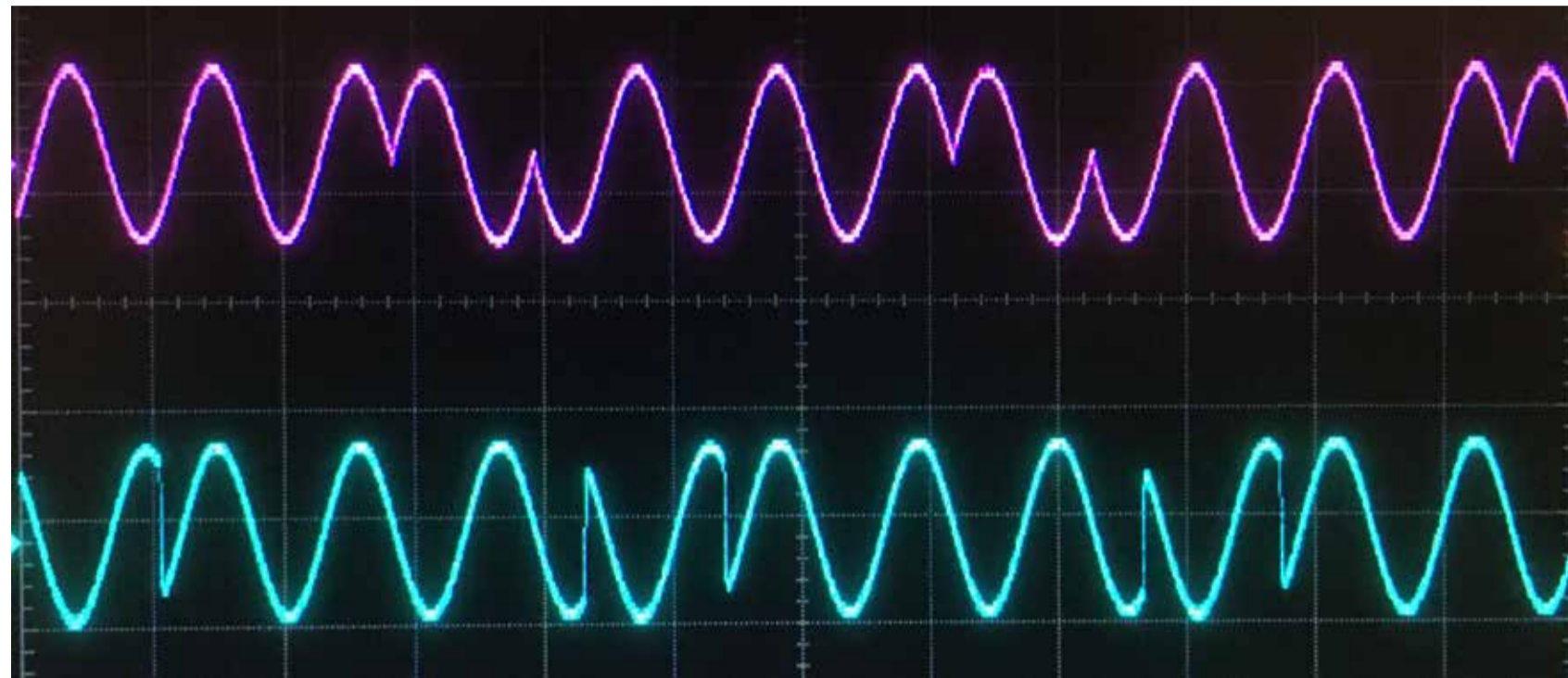
A comparator detects when the input is above or below the threshold and the signal it creates clocks a shift register, which shifts to the next value in its memory each time the wave crosses the threshold. The polarity of that bit - 1 or 0 - determines whether the wave is flipped or not. The values in the register and the register length are changed according to the 'state' control. There are 9 states in total.

The 9 states are pictured on the right. These pictures depict what a sine wave would look like fed to waveshaper 1. Waveshaper 2 has a variable threshold but the function of the waveshaper is the same.

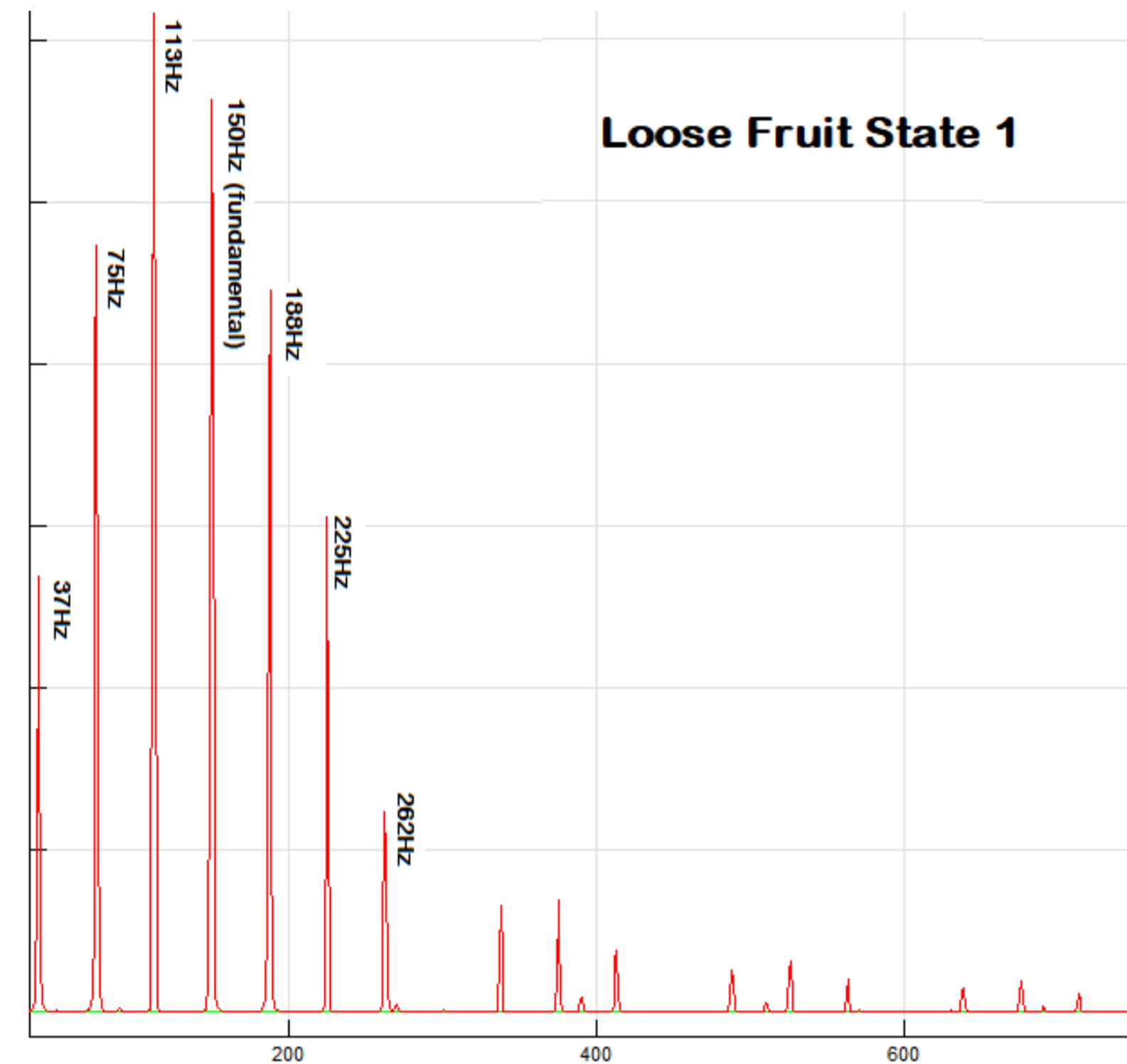


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Outputs from waveshaper 1 (top) and waveshaper 2 (bottom)



The above figure depicts the output of waveshaper 1 (top trace) and waveshaper 2 (bottom trace) with a sine wave input. You can see the different shape created by either waveshaper.



The above figure depicts an FFT of the waveshaper 1 trace from the picture above left. The fundamental frequency is 150Hz, the resulting waveform has its loudest component at 113hz, with subharmonics at 75Hz and 37Hz. There are also high frequency components components at 75Hz and 37Hz.