

## **Waveshaping JR\_2021**

A couple of schematics for waveshaping using a 555 timer or 40106 and op-amp.

### **Waveshaper 555 Timer and Op-amp**

A triangle waveform is taken from a timer (555) integrated circuit (IC) and shaped using an op-amp.

The Threshold output of a 555 timer (pin 6) produces a triangle wave of sorts. This output can be fed into an op-amp where the gain can be adjusted to clip the signal. This clipping will square the waveform. By using a pot to adjust the gain, we can shape the waveform from triangle to square wave and vis versa. A single-supply op-amp circuit is used.

The circuit was first published in the Mute Synth II Booklet, 2014.

#### **References**

Richards, J. (2014). *Dirty Electronics Mute Synth II*. Mute Records [hand-held synthesiser, CD and booklet]. Available at: [https://dirtyelectronics.org/docs/mutesynth\\_booklet\\_A4.pdf](https://dirtyelectronics.org/docs/mutesynth_booklet_A4.pdf)

### **Waveshaper 40106 and Op-amp**

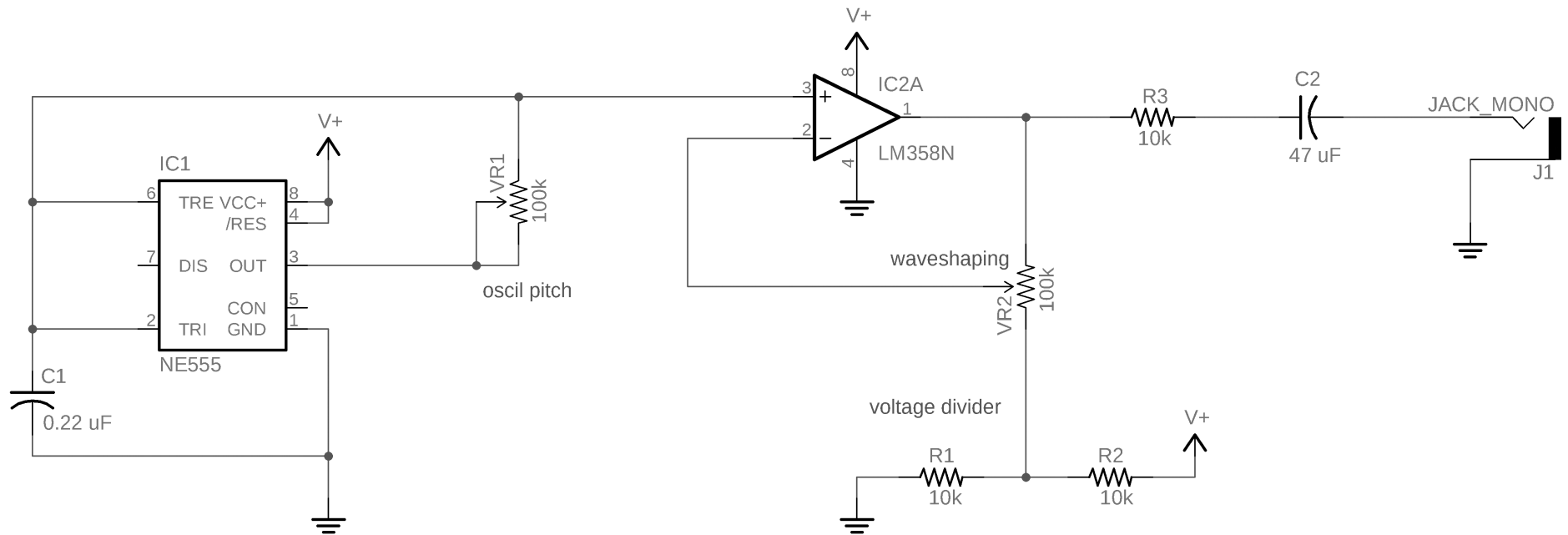
From square to triangle to square.

A squarewave oscillator is generated using the CMOS 40106. This is based on Nicolas Collins' The Worlds Simplest Oscillator. A triangle waveform is then generated from the squarewave by a low-pass, Resistor Capacitor (RC) filter. This output is then fed into an op-amp and clipped as in the 555 timer example above.

#### **References**

Collins, N. (2006). *Handmade Electronic Music: The Art of Hardware Hacking*. New York: Routledge.

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