A voltage-controlled oscillator based around the CEM3340 with an LFO switch.

Based on these designs:
- https://www.lookmumnocomputer.com/projects#/cem-3340-diy-simple
- https://youtu.be/GsTGu2V7tcU

RV1 is a trim pot for fine-tuning frequency.

For R4 (between the pulse output and ground), apparently the AS3340 works better with a 51k resistor here rather than the 10k needed by the CEM3340.

Frequency Input

RV4 controls the coarse tuning of the oscilator.

Notes:

All output jacks connect to the circuit via a 1K resistor to protect the circuit from drawing excess current if the jack socket is ever connected directly to ground.

The AS3340 datasheet gives an example circuit very similar to this one, but powered with a dual 15V power supply instead of this circuit's dual 12V power supply. Component values are changed to accomodate for the different power supply voltage.

With a 12v supply the pulse wave output is measured to be about 0..10V (the manual for the AS3340 says to supply 15V and that the pulse wave output will be 0..12V).

Buffer amp for pulse wave output

PWM Input

RV2 controls a fixed PWM offset.

RV3 controls the degree to which the PWM CV Input affects the PWM.

There will be a small amount of interaction between the two potentiometers as current from the 12V pin of RV2 will flow through RV3 to ground. This means that they don't work completely independnatly from one another, however the effect is minimal. A full turn of RV2 will saturate its signal at about 80% of the turn but this is acceptible as a fuzz factor to cover the result of interactions between RV2 and RV3.

Non-inverting voltage adder to add the outputs of RV2 and RV3. This is imperfect since current can flow between RV2 and RV3 which means that even when nothing is attached to the PWM CV input, turning RV3 will have a small effect on the pulse width.

Non-inverting amplifier with a gain of approximately 1.25. With a 12V power supply the saw wave output is measured to be 0 to approximately 8V, so this scales it up to 0 to approximately 10v to match the pulse wave output.

Non-inverting amplifier with a gain of approximately 2.5. With a 12V power supply the triangle wave output is measured to be 0 to approximately 4V, so this scales it up to 0 to approximately 10v to match the pulse wave output.

Switch to toggle between an audio frequency oscillator and a low-frequency oscillator.

Higher capacitance means a lower frequency. The design this is based off used lower valued capacitors here but I found these values to produce a more useful low-end of the frequency spectrum produced by the oscillator.

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