

NEW IDEAS

Simple sine-wave generator

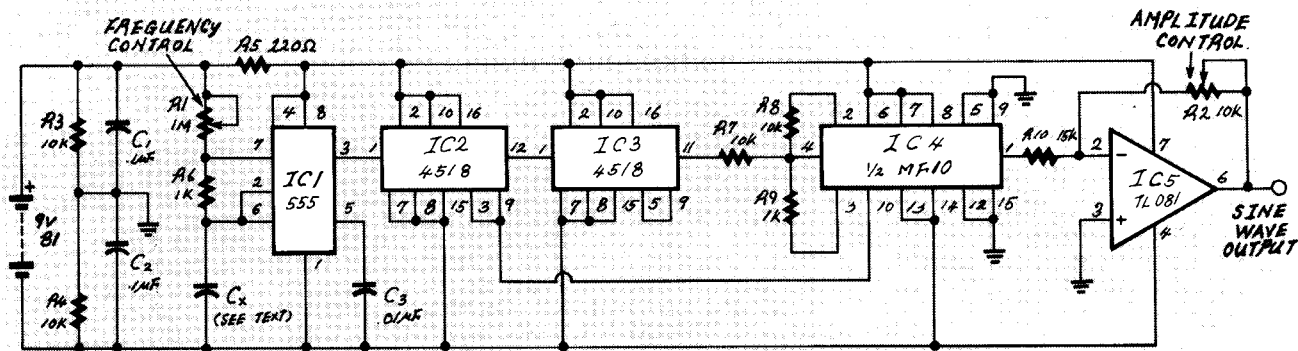


FIG. 1

FOR PEOPLE WHOSE NEEDS DON'T WARRANT buying an expensive feature-filled sine-wave generator, a simple, low-cost one might often be useful. The circuit shown here is just that. It features amplitude and frequency controls, is made from low-cost components that are easy to obtain, and is powered from a 9-volt battery.

At the heart of the sine-wave generator circuit shown in Fig. 1 is an MF-10 IC made by National Semiconductor. It is part of a new generation of switched-capacitor filters that use an ingenious technique of switching internal capacitors to determine the cutoff frequency. The output frequency of the MF-10 follows the frequency of an external clock. A square-wave input signal is fed into the device, and only the frequency of the clock signal is allowed to pass through. All other components of the input signal are filtered out. Because both the clock signal and the input signal must be square waves, a dual-output square-wave oscillator is used to simultaneously drive the clock and signal inputs. Therefore, the clock signal and the input signal are correspondingly shifted so that the MF-10 always filters out all but the

fundamental frequency of the input signal. The result is a nice clean sine wave at the output.

A 555 timer operating in the astable mode generates the driving pulses and two 4518 dual BCD (Binary Coded Decimal) counters provide the square waves. A TL081 op-amp serves as an output buffer-amplifier, and potentiometers R1 and R2 are used in order to control the pulse's frequency and amplitude respectively.

The output-frequency range can be varied by changing C_x . For example, a value of 0.1 μF gives a range from about 0.1–30 Hz, and a value of 470 pF gives a range from about 10 Hz to 1.5 kHz. The maximum output frequency is 30 kHz.

The circuit can be built on a piece of perforated construction board using point-to-point wiring techniques. Further, it is inexpensive to build, and therefore practical for use in dedicated applications where the sine-wave generator is permanently incorporated into another circuit or device.

For more information on the MF-10 switched capacitor filter IC, write to National Semiconductor Corporation, 2900 Semiconductor Drive, Santa Clara, California 95051.—Dale Nassar. **R-E**