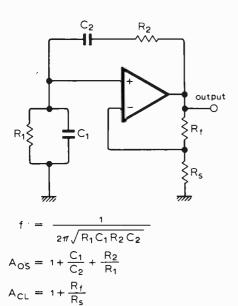
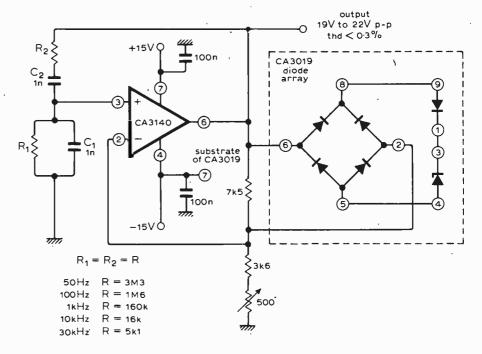
Op-amp Wien bridge oscillator

The CA3140 Bi-m.o.s. operational amplifier offers high input impedance, fast slew rate, and high output voltage capability which makes it suitable for use in a Wien bridge sine-wave oscillator. In the basic circuit, when $R_1 = R_2 = R$ and $C_1 = C_2 = C$, the frequency equation reduces to the familiar $f = 1/2\pi RC$, and the gain required for oscillation is equal to 3. If C2 is increased by a factor of four and R2 is reduced by a factor of four, the gain required for oscillation becomes 1.5, thus permitting a potentially higher operation frequency which is closer to the gainbandwidth product of the CA3140. Oscillator stabilization has to be precise





otherwise the amplitude will either diminish or limit. In the full circuit R_s is formed by a zener diode shunting the feedback resistor R_r . As output signal amplitude increases, the zener diode impedance decreases and reduces the gain, thus stabilizing the output amplitude.

Combination of a monolithic zener diode and bridge-rectifier circuit provides practically a zero temperature coefficient for this regulating system. Because the rectifier circuit does not have a time constant there is no lower

frequency limit. For example, with $1\mu F$ polycarbonate capacitors and $22M\Omega$ for the frequency-determining network, the operating frequency is 0.007Hz.

Output amplitude must be reduced as frequency is increased to prevent the output from becoming slew-rate limited. An output frequency of 180kHz will reach a slew rate of about 9V/µs when its amplitude is 16V peak-to-peak. Mike Bailey,

RCA Solid State-Europe, Middlesex.

Stopwatch facility for calculators

A calculator with a "constant" facility can also be used as a stopwatch. The method will vary between different types of calculator and on a Sinclair Cambridge Memory, if the "+.1" is keyed in and the "=" key is pressed at 10Hz, the calculator will act as a stopwatch.

This function is achieved by wiring a thyristor across the "=" contacts and triggering it from a 10Hz multivibrator. The thyristor will automatically turn off in the absence of a gate pulse because the i.c. sequentially strobes the keys. Accuracy of this multivibrator is adequate for most stopwatch applications over a few minutes.

P. J. Booth, St. Catherine's College, Oxford.

