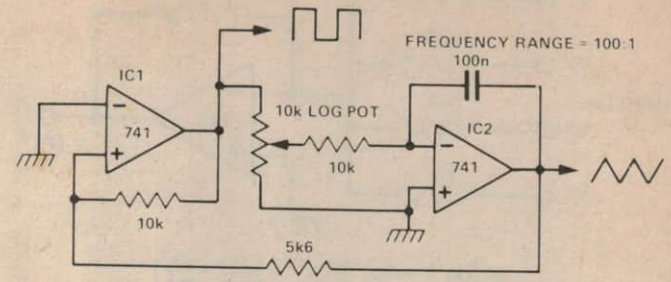
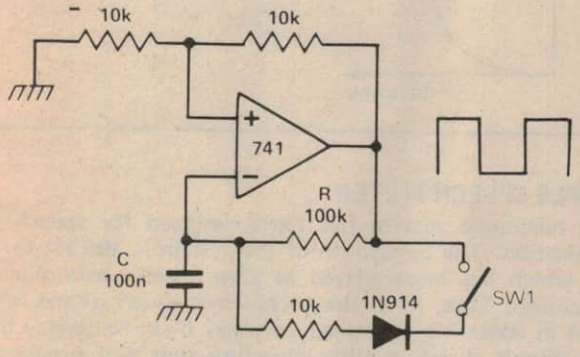
TRIANGLE SQUARE OSCILLATOR

A Schmitt trigger and an integrator can be used to construct a very reliable oscillator which generates triangle and square waveforms. The operation of the circuit is very simple and always self starting. The Schmitt trigger is formed from IC1, the integrator from IC2. Suppose the output of the Schmitt is positive. This will cause the integrator to generate a negative going ramp. This ramp is then fed back to the input of the Schmitt. When the lower hysteresis level has been reached the output of the Schmitt snaps into its negative state, current is taken out of the integrator which then generates a positive going ramp. The integrator's output ramps up and down between the upper an lower hysteresis levels. The speed at which the integrator moves is determined by the magnitude of the voltage applied to it. In this circuit, the magnitude of the voltage and hence the oscillation frequency, are controlled by a potentiometer, giving a 100 to 1 control range. This



circuit is the basis of most function generators. By bending the triangle it is possible to synthesise an approximation to a sinewave. With a bit more electronics it is also possible to make the oscillator voltage controlled.



SINGLE OP-AMP OSCILLATOR

This circuit has a Schmitt trigger and a 'sort of integrator' all built around one op-amp. The positive feedback is via the 10 k resistors. The 'integration', (the timing) is controlled by the RC network. The voltage at the inverting input follows that of the RC charging exponential, except that it is confined to be within the upper and lower hysteresis levels. Thus the hysteresis levels and the RC time constant determine the frequency of operation. It is possible to make the output square wave have a large mark to space ratio. By closing the switch SW1, the discharge time of the capacitor becomes eleven times faster than the rise time. Thus a square wave with an 11:1 mark space ratio is generated.