

### Simple Musical Envelope Generator

A simple generator can be constructed using the CA3080, made by RCA. This circuit will also enable the use of any audio waveform the harmonic structure of which will not be significantly affected as it is modulated. The CA3080 is an op amp with a difference. It has a current output and an extra input into which a current,  $I_A$ , is fed. The output is the product of the input voltage  $\times I_A$ . Thus the  $I_A$  can be used to control the amplifier's gain.

Also the input voltage range for low distortion operation is very low, of the order of  $\pm 25$  mV.

In this circuit, the CA3080 is being used as a two quadrant multiplier. A small voltage ( $\pm 25$  mV) is applied to its non-inverting input. When the switch S1 is closed, the capacitor C is charged up and a current of about  $150 \mu$  A flows into the  $I_A$  input terminal. When S1 is opened, C discharges through the  $150k$  resistor into the  $I_A$  input. This current dies away exponentially. As the output is the product of the input voltage  $\times I_A$ , then an exponential envelope is generated. Breakthrough after the decay is very good, better than  $-80$  dB.

