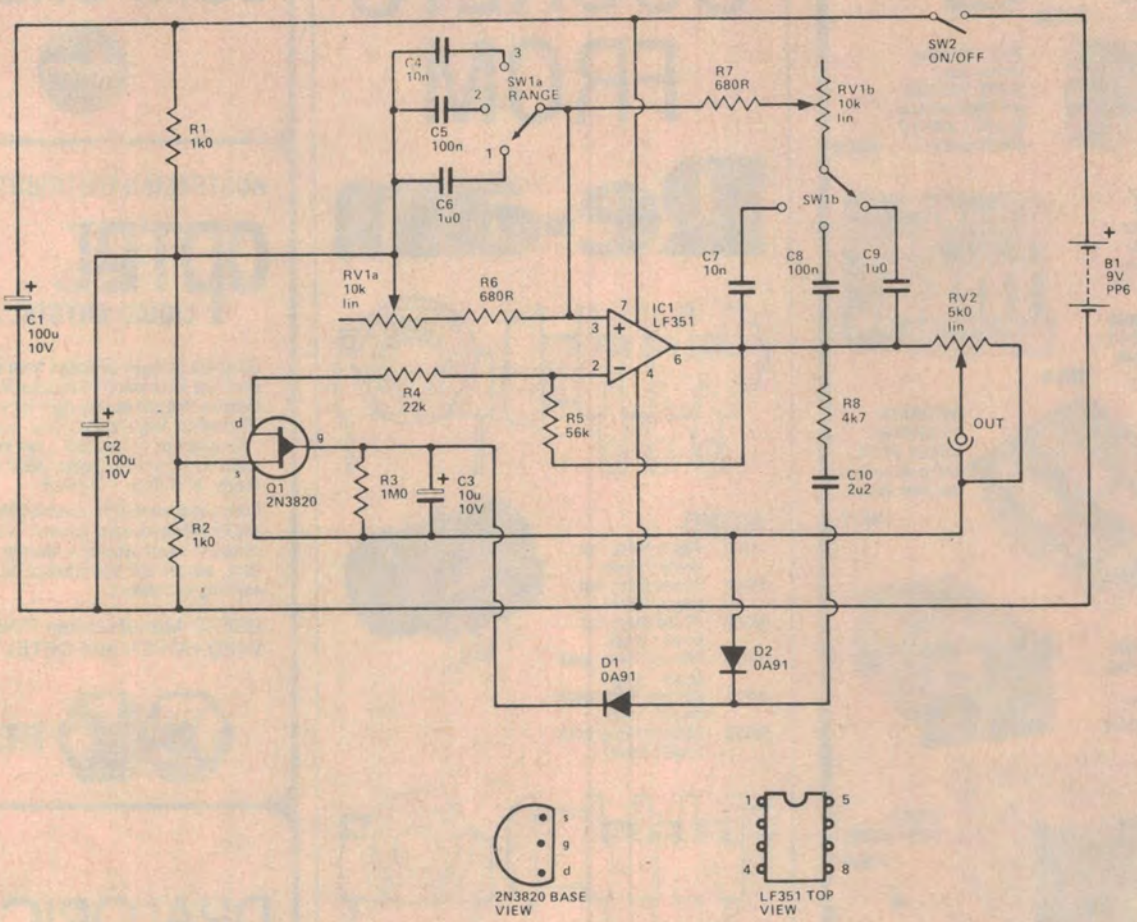

AF signal generator

ONE OF the most useful items of test equipment to have, especially if one has an interest in any type of audio gear, is an AF signal generator. The circuit shown here provides a good quality sinewave output over three continuously variable ranges (Range 1, below 20Hz to above 200Hz; Range 2, below 200Hz to over 2kHz; and Range 3, below 2kHz to over 20kHz) covering more than the entire audio frequency spectrum.

The circuit uses the usual Wien Bridge type circuit, and this form of oscillator consists of an amplifier having frequency selective positive feedback provided via a C-R network. The capacitive elements of this network are whichever two capacitors are selected by SW1, the three sets of capacitors giving the unit its three ranges. The resistive elements are R6, R7 and RV1, the latter permitting the unit to be tuned over the ranges quoted above. This network provides positive feedback over operational amplifier IC1, which is a FET type giving low noise and distortion levels. VR1a and R6 also bias the non-inverting input of IC1 to a central tapping on the supply produced by R1, R2 and C2.

The closed loop gain of IC1 must be maintained at precisely the correct level if good results are to be attained. Insufficient gain would lead to less than full compensation for the losses through the C-R Wien network, with insufficient feedback and consequent violent oscillation with the output signal becoming clipped and seriously distorted. An automatic gain control (AGC) circuit is used to maintain stable operating conditions and a constant output level. R5, R4 and the drain to source resistance of Q1 form a negative feedback network which controls the closed loop gain of IC1. Initially Q1 is forward biased by R3 so that there is enough gain to give strong oscillation. Some of the output from IC1 is coupled by R8 and C10 to a rectifier and smoothing network comprised of D1, D2 and C3. These produce a positive bias which tends to cut off Q1, producing reduced circuit gain. The stronger the circuit oscillates, the larger the bias, and the lower the gain becomes. Lack of oscillation produces reduced bias, more gain, and stronger oscillation. The required stabilising action is thus obtained.

Variable attenuator VR2 enables the output to be adjusted from zero up to about 1.5V RMS. The current consumption of the circuit is about 7 mA. ▶