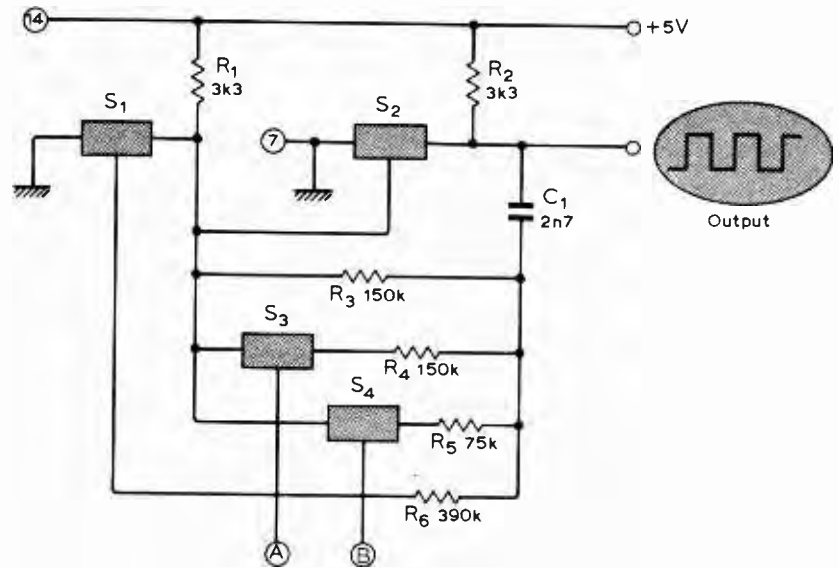


Programmable oscillator

AN I.C. OSCILLATOR produces a range of output frequencies which are programmable using the two digital inputs. The circuit, which has a number of applications such as a multitone alarm or variable frequency clock for a digital system, is based on a single 4016 c.m.o.s. quad bilateral-switch i.c. Switches S_1 and S_2 are used as invertors together with R_3 , R_6 and C_1 , to form an astable multivibrator. Frequency variation is achieved by opening either S_3 or S_4 or both, with control inputs A and B. This connects R_4 and R_5 in parallel with R_3 which changes the time constant of the multivibrator, and hence its frequency. With the components shown, output frequencies of 2, 4, 6 and 8kHz are available. By changing the capacitor and resistor values, higher or lower frequencies can also be achieved.

Frequency modulation is possible by feeding a varying digital signal into the control inputs. Also, by the addition of a second 4016 and four extra resistors in parallel with R_3 , the number of output frequencies available can be raised to 64.

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Overload protection and transient elimination

THIS CIRCUIT is suitable for use with d.c. coupled audio power amplifiers, and combines protection against current overloads with delayed switch-on for the elimination of output transients. Transistor Tr_5 is initially turned off, and C_2 charges via R_{10} . After a delay of about 1.5s the relay switches on which closes S_1 and connects the load to the amplifier. If a large current flows in Tr_1 or Tr_2 of the amplifier output stage, Tr_3 or Tr_4 will turn on. This turns on Tr_5 and the relay switches off. The circuit is reset by switching off the amplifier until

the supply has dropped to a few volts, and Tr_5/Tr_6 are no longer saturated.

Capacitor C_1 reduces the susceptibility to spurious operation, and D_5, D_6 provide protection for Tr_7 and Tr_8 . Point A is a virtual earth summing junction so other amplifier channels can be accommodated. The circuit can also be modified for different supply voltages, overload currents and delay times.

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