

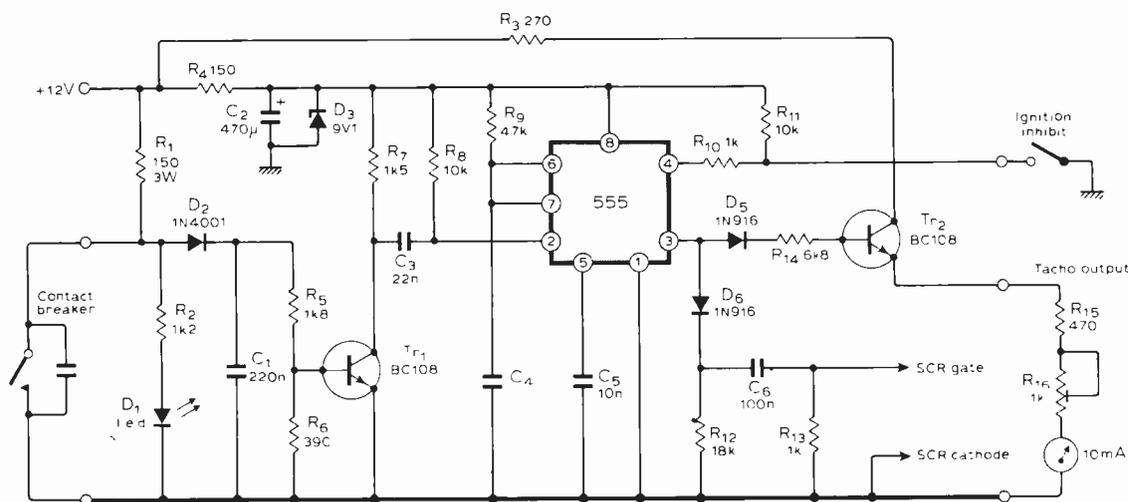
# CIRCUIT IDEAS

## Trigger circuit for c.d.i. systems

THIS trigger circuit provides r.p.m. limiting and a tachometer output. When the contact breakers open,  $C_1$  is charged via  $R_1$  and  $D_2$ , which turns  $Tr_1$  on. The negative going pulse at  $Tr_1$  collector triggers the 555, which is used in the monostable mode, and the resulting positive pulse from the 555 fires the s.c.r. via  $D_4$  and  $C_6$ . When the contact breaker closes,  $D_2$  isolates  $C_1$  to reduce the effect of contact bounce. Once the 555 is triggered any further trigger pulses on pin 2 have no effect until the

timing period is over. This eliminates any contact bounce that gets past  $D_2$  and  $C_1$ , and gives an effective upper limit to the engine speed. Because the timing period is constant the mark-space ratio of the 555 output, and hence the mean d.c. level, is proportional to the engine speed. A voltmeter connected to the output of the 555 can be used as an accurate tachometer. The loading effect of the meter on the s.c.r. trigger pulse is reduced by emitter follower  $Tr_2$ . The r.p.m. limit for a four

stroke engine is given by  $R = 109.1/n R_9 C_4$ , where  $n$  is the number of cylinders. For a limit of between 8000 and 9000 r.p.m. with  $R_9$  at  $47k\Omega$ ,  $C_4$  is  $0.068\mu F$  for 4 cylinders,  $0.047\mu F$  for 6 cylinders, and  $0.033\mu F$  for 8 cylinders. By connecting the reset input of the 555 to the 0V line, trigger pulses at pin 2 will have no effect on the monostable so the s.c.r. will not be triggered. This can be used as an anti theft facility. The l.e.d. across the contact breakers can be useful when setting the static timing. *K. Wevill, Birmingham.*



## Improved Schmitt trigger oscillator

WITH a normal t.t.l. Schmitt trigger oscillator (a), closing the switch stops the circuit immediately and cuts short the last cycle. This effect is especially noticeable at low frequencies. Also, the maximum value of  $R$  is limited to approximately  $1k\Omega$ .

To avoid these problems the circuit in (b) uses the remaining half of a 7413 i.c. to form a RS bistable which ensures that the cycle is completed when the switch is opened. An emitter follower is also used which allows the value of  $R$  to be greater than  $10k\Omega$ . A t.t.l. square wave is available at point N and a low imped-

ance exponential sawtooth at point C. Point A is high when the oscillator is running, and can be used as a control signal.

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