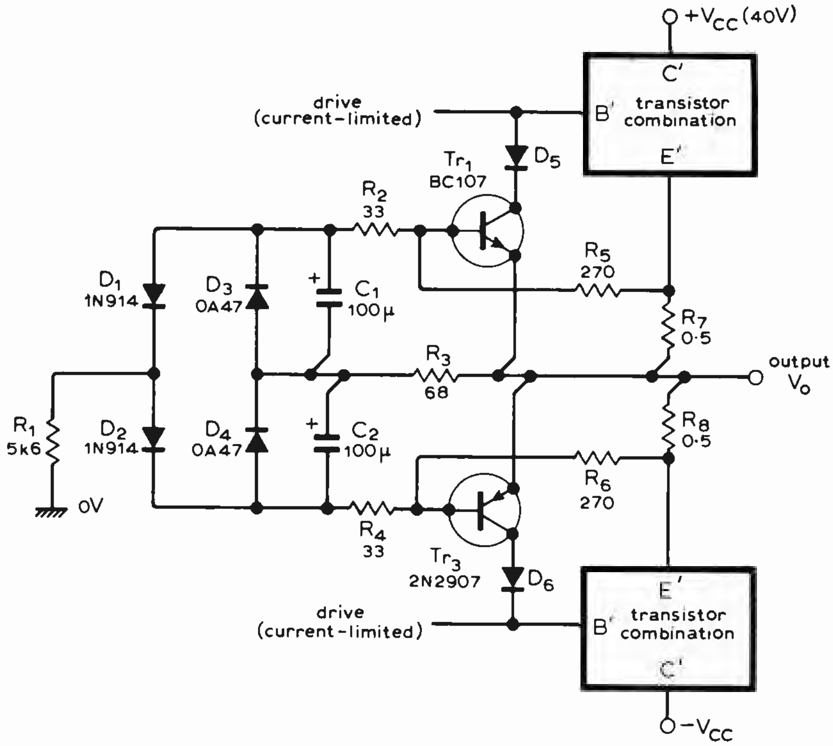
Amplifier output protection

Most power transistor protection circuits are a compromise because they have to limit the dissipation of each transistor and, at the same time, not limit the capabilities of the amplifier when driving a reactive loudspeaker load. This circuit avoids such a compromise.

During continuous a.c. drive into a normal load, R_1 draws current from C_1, via D_1, in opposition to R_5. Full drive into an 8Ω load will give an average V_{C1} and V_{C2} of about 0.12V which is sufficient to enable full drive into a load of $4\sqrt{2} \pm j4\sqrt{2}\Omega$. Continuous drive into a short-circuit will produce an average V_{C1} and V_{C2} of about 0.55V which will limit the average current in each output transistor to about 1.1A (2.2A peak). Diodes D_3 and D_4 ensure that C_1 and C_2 do not have a reverse voltage of more than 0.2V. Diodes D_5 and D_6 are necessary to prevent current flowing from the base to collector of Tr_1 and Tr_2.

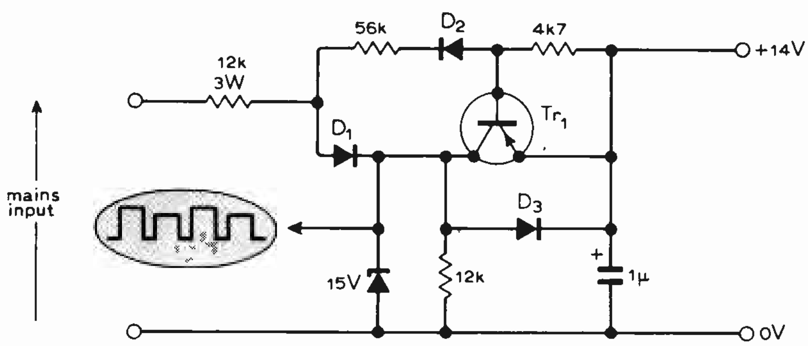
M. G. Hall,
Emsworth,
Hants.



Zero crossing detector

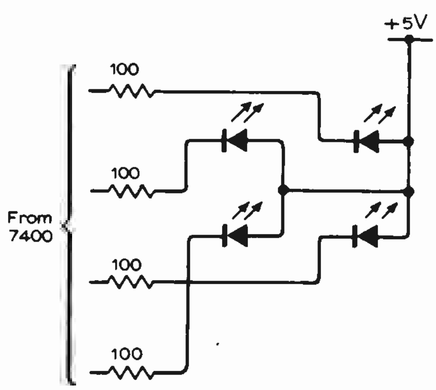
This circuit provides a zero-crossing signal and a d.c. output. Diode D_1 is the only semiconductor which has to withstand the full mains reverse voltage. Positive going half cycles forward bias D_1, which allows C_1 to charge up to 14V via D_3. Negative half cycles forward bias D_2 which turns Tr_1 on and passes current to the output from C_1. The output is about 1V less on negative half cycles and is given by $(V_{D3} + V_{sat\ Tr1})$ less than V_z.

R. J. Torrens,
Scientronics,
Huntingdon.



Beat-frequency indicator

The published circuit in the November issue shows four l.e.ds in a line. To obtain the rotating effect these diodes must be positioned in a square but, because the "firing order" is 2, 1, 3, 4 they should be arranged as shown here. Also, the reference frequency input should be via a BC108 as for the input frequency.



Digital alarm clock

IN the November issue of Wireless World a digital alarm clock was published which used the MM5316 clock chip. National Semiconductor has informed us that the device was designed to supply a maximum segment drive current of 500µA and therefore does not recommend its use with the l.e.d. displays. The MM5387 is a pin compatible device which will supply up to 5mA, and the MM5385, which is not pin compatible, will supply up to 15mA per segment.

The author agrees that the MM5316 is operating out of its specification but points out that he has successfully built four such clocks and two of them have been running for over two years.