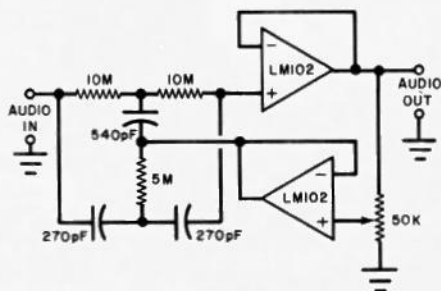


# Hobby Scene

## 60-HZ FILTER FOR HEADPHONES

**Q.** I like to use hi-fi headphones with my shortwave receiver, but am bothered by 60-Hz hum. Can you provide a circuit which will filter out the hum?—M.K. Jeeves, Saskatoon, Saskatchewan.

**A.** The circuit shown below is a 60-Hz adjustable-Q notch filter. Adjusting the 50,000-ohm potentiometer at the



output of the second voltage follower for the twin-T R-C filter permits varying Q from 0.3 to 50. This varies the width of the 60-Hz notch. The notch depth depends on component matching. Using 1% resistors and 1% capacitors should give good results.

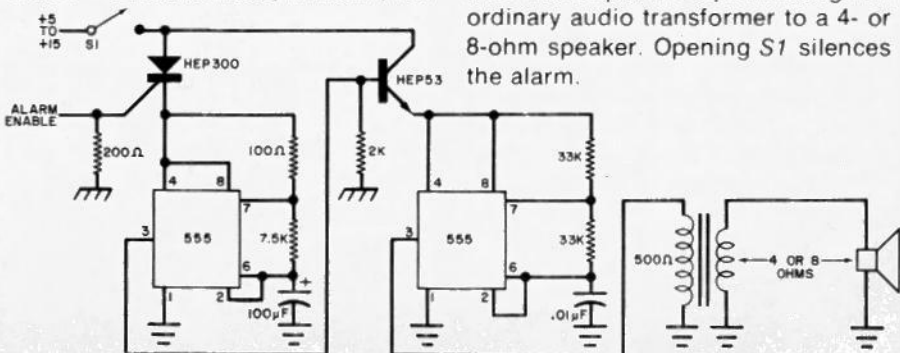
## CAPACITOR TYPES AND USES

**Q.** I would like to know the difference between polystyrene, mica, ceramic, and paper capacitors. For what applications is each type used?—Roger Simoneau, Montreal, Canada.

**A.** The difference between the types is in the material that makes up the dielectric (the insulating material between the two metal plates of the capacitor). The thinner the dielectric, the higher the capacitance because the plates are closer together. (This is assuming a constant plate area. Plate area can also be increased to increase the capacitance, which is the thing to do for high voltages.) Ceramic capacitors can be used for coupling and bypassing applications or in tuned circuits at frequencies up to 100 MHz (if care is taken in sizing and dressing leads). Most mica capacitors can be used at frequencies up to a few hundred MHz. Polystyrene capacitors exhibit properties similar to those of good mica capacitors, while Mylar units suffer from inductive reactance problems similar to those of paper capacitors.

## DIGITAL CLOCK BEEPER

**Q.** I have installed an alarm in my digital clock and would like to have an audible beeper. I was trying to create a circuit that would produce a half-second pulse, then pause for a half-second, and pulse again, continuing this cycle until the power is turned off. I was using 555 timers but couldn't make a workable circuit. Any ideas?—D. Blumenfeld, Millburn, NJ.



**A.** The circuit shown should work. The alarm enable pulse from the clock will turn the SCR on (assuming S1 is closed), which provides power for the first 555. This timer runs in the astable mode with a 50% duty cycle and a rate of 1 Hz. Timer output turns the transistor on and off, which controls power for the second 555. This timer is also free-running, but at a frequency of 1.5 kHz. The output is coupled through an ordinary audio transformer to a 4- or 8-ohm speaker. Opening S1 silences the alarm.