

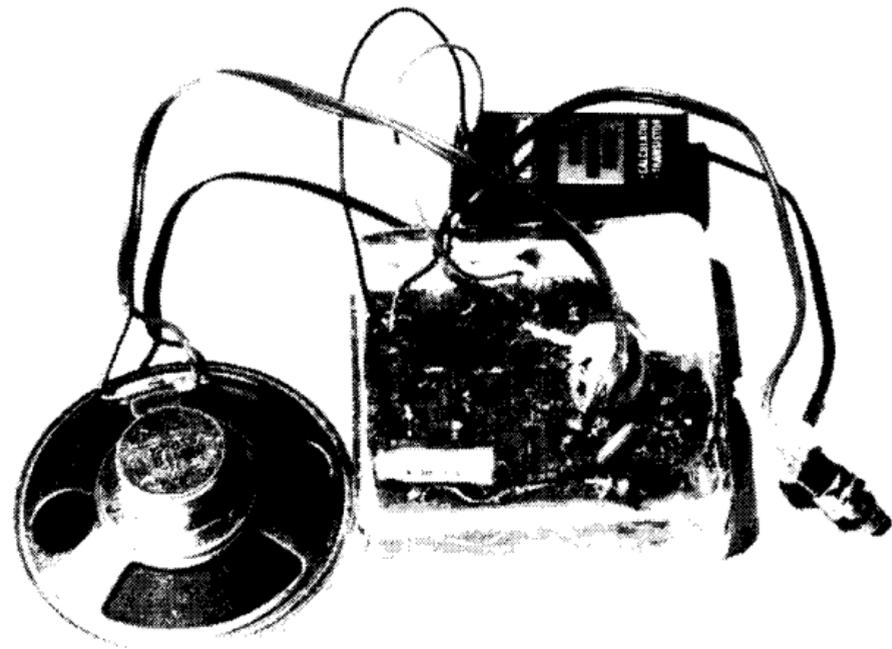
### 3. ELECTRONIC BIRD CHIRPER

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The schematic of the electronic bird chirper is shown in Fig. 3. Transistors Q1 and Q2 form the two halves of a free-running multivibrator whose fre-

quency is determined by the voltage across C8. That capacitor is charged and discharged by closing and opening switch S1.

Transistors Q3 and Q4 make up a variable-frequency oscillator similar to the one used in the siren. The output of the free-running multivibrator frequency



modulates the Q3-Q4 oscillator, causing the "chirping bird" sound. The number of chirps per second is determined by the frequency of the Q1-Q2 multivibrator, which also varies. The pitch of the chirps is determined by C5 and C6.

### Construction

Once again, there is nothing critical in

### PARTS LIST—BIRD CHIRPER

#### Resistors, 1/4 watt, 5%, unless otherwise noted

R1, R8—20,000 ohms  
 R2, R4—4700 ohms  
 R3—12,000-18,000 ohms  
 R5—180 ohms  
 R6—5600 ohms  
 R7—120,000 ohms

#### Capacitors

C1, C3—10  $\mu$ F, 6 volts or higher, electrolytic  
 C2—3300  $\mu$ F, 10 volts or higher, electrolytic  
 C4—.0047  $\mu$ F, Mylar or ceramic disc  
 C5—0.1  $\mu$ F, Mylar or ceramic disc  
 C6—.02  $\mu$ F, Mylar or ceramic disc  
 C7—200  $\mu$ F, 10 volts or higher, electrolytic  
 C8—100  $\mu$ F, 10 volts or higher, electrolytic

#### Semiconductors

D1—1N914  
 Q1-Q3—2N3904, 2N2222, or equivalent NPN transistor  
 Q4—MJE370 or 2N4919 PNP transistor  
 B1—9-volt battery, transistor-radio type  
 S1—SPST momentary pushbutton switch, normally open

**Miscellaneous:** wire, solder, miniature 8-ohm speaker, etc.

the layout of this project; it can be built using any of the popular construction techniques. The chirping is controlled by opening and closing switch S1, a normally open, momentary SPST pushbutton switch. When you finish the circuit, if the pitch of the chirps is too low and not bird-like, you can omit C5; but monitor the battery current if you do

so. (If you can, substitute a current-limited power supply for the battery while you are testing the circuitry; doing that will prevent the battery from draining. If the current drain exceeds 50 milliamperes when S1 is closed for a second or so, you should raise the value of C6. Be sure to use the listed transistor for Q4.

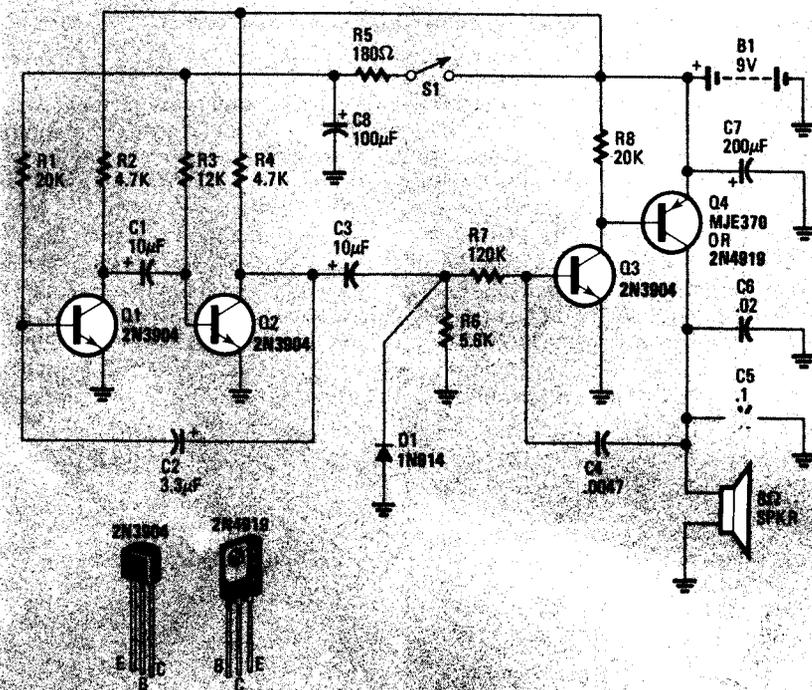


FIG. 3—SCHEMATIC DIAGRAM of the bird-chirper toy. The pitch of the bird sounds is determined by capacitors C5 and C6 (see text).