

60c ■ JUNE 1971

# Radio-Electronics

FOR MEN WITH IDEAS IN ELECTRONICS

## BURGLAR ALARM DESIGN— 24 CIRCUITS

High-Selectivity  
Preamp For FM

Troubleshooting CBs

ELECTRONIC DRIVE CIRCUITS  
For Low-Rumble  
Turntables

How Dolby  
Reduces Noise

NEW FEATURE!  
Potpourri of  
IC Applications



A  
GERNSBACK  
PUBLICATION

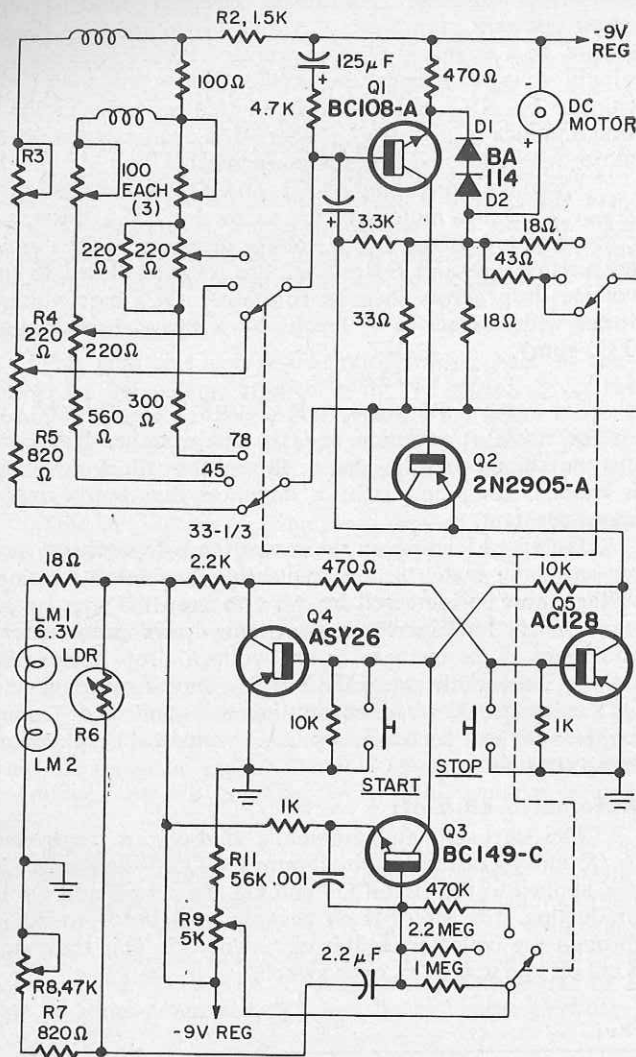


FIG. 5—NORELCO MODEL 202 CONTROLS. R4-a and R4-b in text are resistances above and below the arm of R4.

Pressing the START button grounds Q4's base so the multivibrator switches and Q5 conducts to complete the motor circuit. Pressing the STOP button grounds Q5's base. This causes the multivibrator to change state; cutting off current to the motor and keeping it off until the START button is pressed again.

The automatic shut-off is activated by a photoelectric circuit consisting of lamp LM2 and light-dependent resistor (LDR) R6. Attached to the bottom of the pickup-arm shaft or spindle is a film mask with a "V" shaped slot that passes between LM2 and LDR when the stylus moves in to about 65 mm from the turntable center. The mask decreases the light striking the LDR, causing its resistance to rise and increases the voltage drop across it. Note that C1 is connected between two voltage dividers; one R6-R7-R8 and the other R9-R10-R11 (in the 33 1/3-rpm position).

The amount of light on the LDR decreases with each revolution of the record, resulting in a voltage drop of  $\Delta E$  volts per revolution. The time-constant of the R-C circuit is set so the charge on C2 drains off faster than it increases and, thus, has no effect on circuit operation.

However, when the stylus reaches the run-out grooves at the end of the record—run-out grooves have a much greater pitch than music grooves—the voltage drop across the LDR is now much higher than  $\Delta E$  volts per revolution. The voltage across C1 is now rising faster than it can leak off so it soon reaches the point where it turns on Q3. This triggers the multivibrator; turning on Q4 and turning off Q5 to stop the motor.

R-E

## Mounting IC Flat-Packs

by CHARLES D. GEILKER

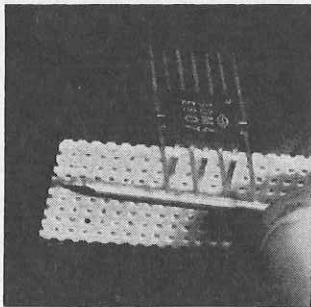
Flat-packs are currently the biggest bargain for IC experimenters—but making fourteen connections to a 1/4-inch square can have its problems. The ideal mounting method would not greatly increase the size, would not require special tools, and would cost only a small fraction of the price of the IC.

Test sockets are available, but the least expensive ones cost more than \$2, which seems excessive when the flat-packs cost only 75¢.

The appearance of Vero-board for ICs and (Vero Type 50255) and Micro-Vector-board (Vector Electronics Type 126M76/032), a perf-board with diameter holes 0.025-inch, spaced on 0.050-inch centers, has made flat-pack mounting simple.

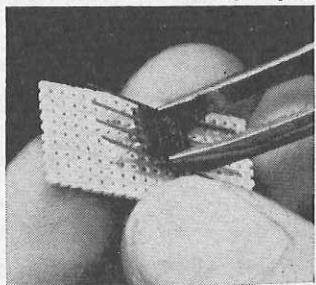
1. Using regular scissors, cut a 0.50 by 0.95-inch rectangle of perf board. This can best be done by cutting along a line drawn through the 10th and 19th rows of holes.

2. Using the edge of the board as a guide for thickness and spacing, bend down



three alternate leads on each side. A nail or small screwdriver blade is helpful here.

3. Insert the bent leads into the 6th row of holes from each end, using a pair

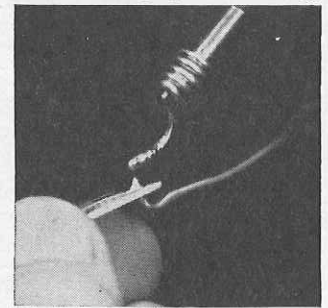


of manicure tweezers. Bend the six inserted leads flat against the reverse side of the board.

4. Cut fourteen 3-inch-long pieces of Belden 8014 indoor antenna wire. This may be done speedily by inserting the wire through the center of the metal spool (500-foot size), snipping, inserting

more wire, snipping, etc. Strip both ends of each piece of wire: one end 1/16 inch, the other 1/4 inch. Do not twist or tin.

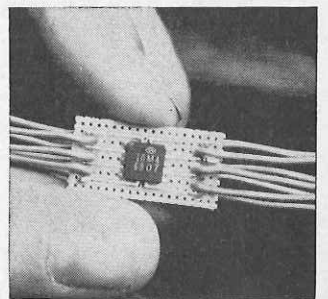
5. Wrap the tip of the soldering iron with bare No. 18 copper wire and form into a curved extension. Heat up the iron and tin the extension thoroughly. Even a 1/8



inch tip used directly is both too large (wider than two flat-pack leads) and too hot (the end of the extension should just comfortably melt the solder without "flashing" the flux to instant smoke).

6. Solder a wire to each flat-pack lead, passing the 1/16 stripped end through the perf-board hole from the opposite side, beginning with lead #1 and continuing, in order, to lead #14. The extension tip of the soldering iron should be brought in parallel to the lead and at an upward angle.

7. After all leads are soldered, with six entering from the top and eight entering from the bottom, bend the leads from both sides outward.



The finished product is a 923-923 dual J-K flip-flop, ready to use in an experimental circuit. A single piece of micro perf-board will mount more than fifty flat-packs, for about 6¢ each, and with a little practice the mounting procedure can be done in ten minutes.

Mounted in this way, the IC assembly is smaller than the commercial socket, and the experimenter has a durable, component.

R-E