ATTENTION GRABBER

Synchronized dual duration flash rate for up to 300 watts of incandescent light!

by C. R. Lewart

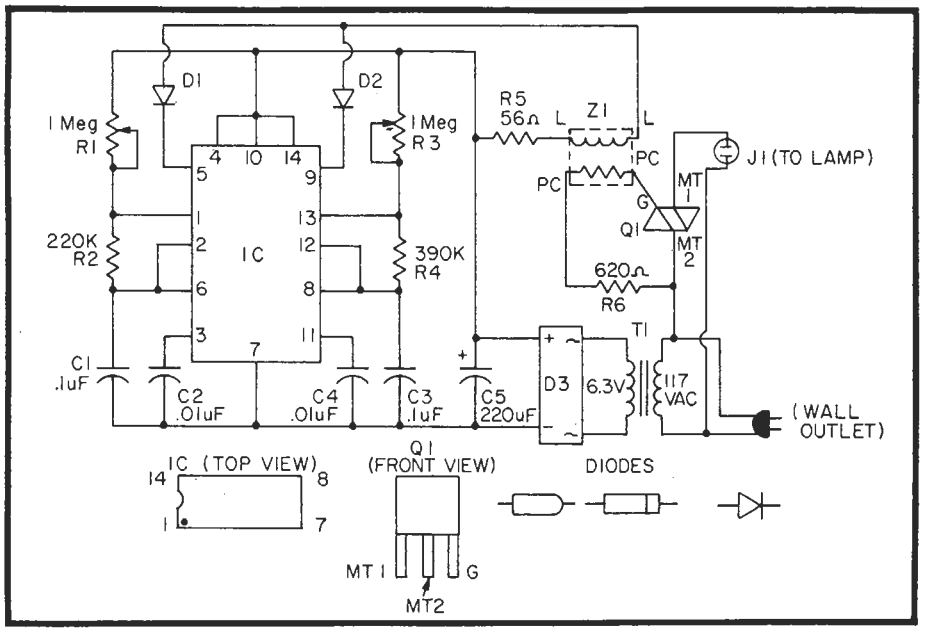
HERE'S A FLASHY project with some interesting and novel features. It can be used to control lamps up to 300 watts. The on-off ratio of the flasher and the relative length of the subsequent "on" times can be adjusted with two controls; thus you create a unique "dot-dash" effect. In addition, the flasher contains only solid-state components for long-term reliability. The flasher can be used for Christmas lights, window displays, Halloween pumpkin illumination, psychedelic lights and many other special effects.

If you watch the blinking lights for a few minutes you will understand the name we gave to this project.

Building it will make you familiar with various solid-state devices such as triacs, timer integrated circuits, opto-isolators and photocells.

How Does It Work? The integrated circuit "556" consists of two "555" timing sections described in previous projects. Its two outputs on pins No. 5 and No. 9 (see schematic) are separately controlled with potentiometers R1 and R3. When any of the outputs is in the "low" state, the pilot lamp in the light coupler lights and lowers the resistance of its associated photocell. A low photocell resistance makes the triac conduct and the circuit supplies full AC voltage to the lamp socket. When both of the timer outputs are "high" the light goes out and the triac stops conducting. The process repeats itself thus giving the flasher effect. The low voltage section of the circuit is separated from AC voltages by the light coupler. The transformer T1 with its associated rectifier bridge and capacitor, C5, supplies DC voltage to operate the integrated circuit and the lamp in the light coupler. The two diodes, D1 and D2, isolate the two timer sections of the IC.

Construction. You can build this circuit easily on a 2½ x 3½-in. perf board using point-to-point wiring. No special wiring precautions are necessary except for the section of the circuit which carries AC voltage. Make sure that it is well insulated and kept away from the rest of the circuit and the cabinet. Use a 14 pin socket for the IC. Insert the IC only when you are ready to test the circuit. If you substitute a



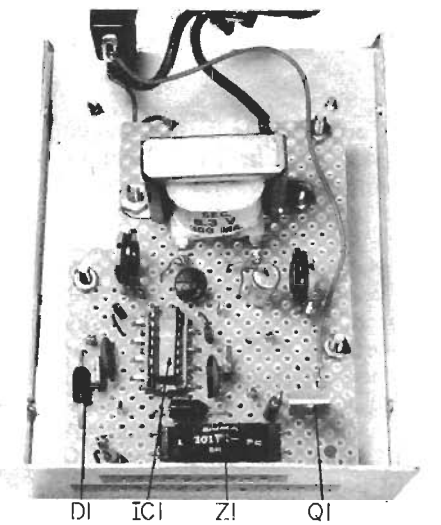


Fig. 1—Inside-chassis view of completed Attention Grabber shows location of parts. Mounting them on perf board is easy because locations are not critical. Larger or smaller board and box can be used, so long as schematic diagram is followed for connections. Any household lamp or bulb up to 300 watts can be turned on-and-off by this unit.

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separate pilot light and a photocell for the light coupler, wrap the photocell and the pilot light together with black electric tape. Make sure that the active side of the photocell (the one with the pattern) faces the pilot light and that the photocell pins are insulated and do not touch the pilot light pins. To use this photocell-and-pilot lamp setup in place of the light coupler see the Parts List.

Operation. The only two adjustments for the flasher are R1 and R3. They let you select the on-off times and also to some degree the two different "on" times. If you wish to do some experimenting try different values for C1 and C3 between .01 and 1 μF. You may also try different values of R2 and R4 between 50,000-ohms and 1-megohm.

If you would like to be able to change the flasher characteristics while the unit operates, mount R1 and R3 on the cabinet rather than inside the cabinet on the perf board as shown. ■

PARTS LIST FOR ATTENTION GRABBER

C1, C3—0.1 μF capacitor (Radio Shack 272-1069 or equiv.)
C2, C4—0.01 μF capacitor (Radio Shack 272-1065 or equiv.)
C5—220 μF electrolytic capacitor, 35 VDC (Radio Shack 272-1017 or equiv.)
D1, D2—1-amp, 50-PIV silicon diode (Radio Shack 276-1135 or equiv.)
D3—1-amp, 50 PIV bridge rectifier (Radio Shack 276-1151 or equiv.)
IC—556-type timer integrated circudit (Radio Shack 276-1728 or equiv.)
Q1—6-amp, 200 volt triac, GE SC141 (Radio Shack 276-1080 or equiv.)
R1, R3—1-meg potentiometer, PC-type (Radio Shack 271-229 or equiv.)
R2—220,000-ohm, ½-watt resistor (Radio Shack 271-000 or equiv.)
R4—390,000-ohm, ½-watt resistor (Radio Shack 271-000 or equiv.)
R5—56-ohm, ½-watt resistor (Radio Shack 271-000 or equiv.)
R6—620-ohm, ½-watt resistor (Radio Shack 271-000 or equiv.)
Z1—light coupler, Sigma 301B1-6B1 (Allied Radio 917-1417 or equiv.)
Note—You can make a light coupler see text) with a 6-volt, 25 mA lamp (Radio Shack 272-1140) and a CdS photo cell (Radio Shack 276-116) to use in place of the commercial unit.
Misc.—case 4 x 2⅜ x 6-in. (Radio Shack 270-252 or equiv.), AC socket (Radio Shack 270-642 or equiv.), 14-pin IC socket (Radio Shack 276-027 or equiv.), wire, solder, hardware, etc.

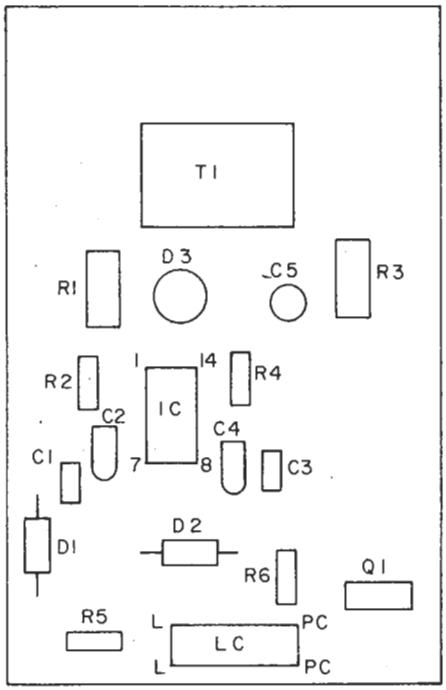


Fig. 2—Parts layout for easy point-to-point wiring is shown above. Inexperienced builders should follow this plan for trouble-free construction. Experienced constructors can use any convenient layout desired.

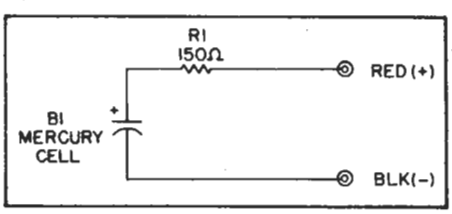
BUILD AN ACU-VOLT CALIBRATOR

THIS EASY PROJECT GIVES YOU A SUPER-ACCURATE VOLTAGE SOURCE FOR CALIBRATING YOUR VOM OR VTVM.

by F. Chapman

☐ You have just finished building that new kit VOM or VTVM and are ready to adjust the calibration. And what do you use—the standard 1.5-volt off-the-shelf dry cell from the local drugstore. Maybe you want to check the accuracy of your meter after a hard bounce in the trunk of the family gas hog. Out comes the slightly used cell from the under-dash flashlight.

Sure, I know, the book says that a fresh dry cell has a terminal voltage of 1.56 volts. But the key word is *fresh*. Just how fresh *is* that cell you are using? How long has it been sitting on the dealer's shelf, or in the flashlight? It *could* be three years old!



Your VOM probably has an accuracy of 2% of full-scale. Why not use a cell whose *known* accuracy is much better than the meter's?

Use a Mercury Cell. Such an animal is the mercury cell, of which there are two types. One has a cell voltage of 1.4 volts, the other 1.35. The latter has an accuracy of about ½% when loaded with one mA or less. Since most VOM's worth calibrating are at least 20,000 ohms per volt, this means they have a full scale deflection current of 50 microamperes. On a 2.5 volt DC scale 1.35 volts will take only 27 microamperes of current from the cell. This allows us to put a resistor in series with the cell and jacks to limit short circuit current to about 10 mA. This insures that the cell will not be damaged by an accidental short. Any of the cells whose voltage is 1.35 volts will do. You will note that they all have an "R" at the end of the type number (Example: An RM12 is a 1.4-volt cell. An RM12R is 1.35 volts.)

Mount the cell, its holder, resistor and red and black pin jacks in a small plastic case and you have a very accurate means of checking your DC meters calibration.

You might feel that it would be good to have several different voltages for calibration. Not so. Most good meters use 1% resistors in the voltage-measuring circuit. Further, they normally only have a single DC adjustment. Set the calibration control on one scale and it should hold within 1% for all other scales. ■

PARTS LIST FOR ACU-VOLT CALIBRATOR

B1—Mercury cell 1.4 volts (Radio Shack 23-1520 or equiv.)
R1—150-ohm, ½-watt resistor, 10% (Radio Shack 271-000 or equiv.)
Misc—Binding posts, one red, one black (Radio Shack 274-662 or equiv.), small box, aluminum (Radio Shack 270-235 or equiv.), or bakelite, (Radio Shack 270-230 or equiv.)