

# ELECTRONIC COLOR MATCHER

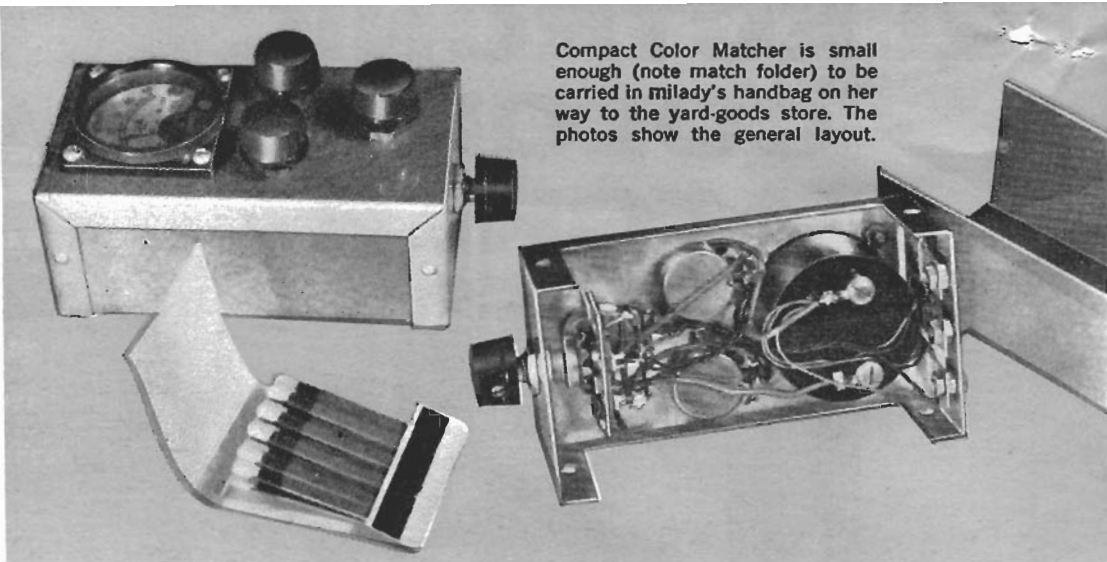


*Ever tried to touch up a scraped fender? This interesting, easy-to-build gadget will tell you what shade paint to use*

**By RUFUS P. TURNER**

**A**RE YOU doing a patch-up paint job? Do you mix inks or other colored fluids? Have you tried to match materials at the dry-goods store? If your answer is yes to any of these questions, you're in the market for a color meter. These devices are seldom found outside laboratories and can be quite costly, but the electronic "Color Matcher" described here can be built at a new-parts cost of \$15.00, and is more than adequate for most purposes. Measuring just 4" x 1 $\frac{3}{8}$ " x 2 $\frac{1}{8}$ ", it weighs only 12 ounces; no batteries or power supply are needed.

**How Color Meters Work.** The action of a color meter circuit is the same as that of a simple light meter, except that in the latter the light must pass through either a red, green, or blue filter on its way to the photocell(s). Colors are compared by illuminating the first sample with white light (sunlight, for example), switching to the "red" position and setting the "red"



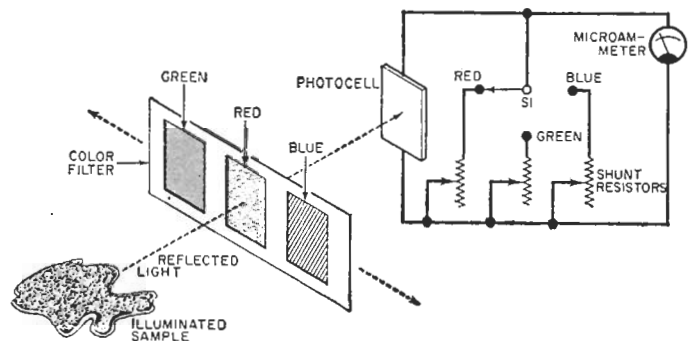
Compact Color Matcher is small enough (note match folder) to be carried in milady's handbag on her way to the yard-goods store. The photos show the general layout.

shunt for a selected deflection, then making the same adjustment for green and blue. When another color sample is substituted, the three readings will be the same if the color is the same, or will indicate a mismatch and excesses or deficiencies of red, green, and blue. The three controls can also be set for a standard deflection while viewing a plain white surface; relative red, green and blue readings will then be obtained with color samples.

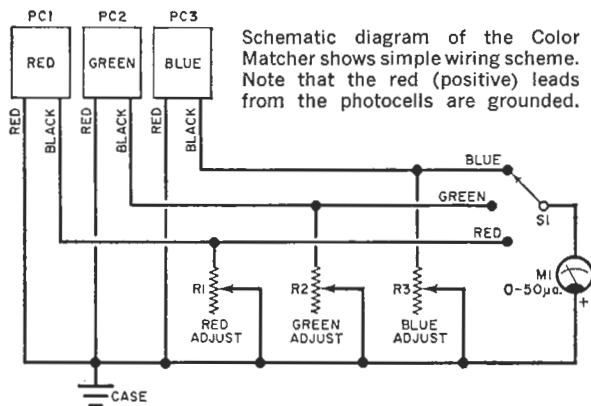
**Color Matcher Design.** Although some commercial models use a single photocell and sliding filters, the Color Matcher was built around three International Rectifier B2M photocells (*PC1*, *PC2*, and *PC3*). Also needed are three subminiature 50,000-ohm potentiometers (*R1*, *R2*, *R3*), a three-position switch (*S1*), and a 0-50 d.c. microammeter (*M1*).

Using a 1½" socket punch, cut a hole for the meter at one end of the top of a 4" x 2½" x 1½" Minibox. At the same end, cut in the side a 1¾" x ¾" window for the photocells. The best tool for this job is a thin-bladed coping saw; start it through a ⅛" hole. Finally, drill *M1*'s mounting holes, three ¼" holes for the controls, and a ⅜" hole for *S1* in the end of the box opposite the "window."

To make the photocells sensitive to color, get some Wratten gelatin filters at a camera store. They come in 2" x 2" thin transparent sheets, and sell for 60 cents each. The red is Eastman Kodak No. 25A, the green No. 58, and the blue No. 47. Cut a ½" x ¾" strip of each color and tape it to one of the three photocells. Use narrow strips of Scotch tape, masking as little of the film and cell surface as possible. The film must rest flat against the cell face. Avoid touching the



Basic color meter circuit is shown at left; its operation is similar to that of a light meter. The author's model differs in detail—three photocells with fixed filters are used, making a cumbersome, costly, filter switching arrangement unnecessary.



The photographs below show the exterior of the unit. A  $1\frac{3}{4}$ " x  $\frac{7}{8}$ " window is cut in the chassis for the photocells, a hole punched for the meter, and mounting holes drilled. Out of sight at the other end of the box is switch S1.

### PARTS LIST

- M1—Miniature 0-50 d.c. microammeter (Lafayette TM-200 or equivalent)  
 PC1, PC2, PC3—Miniature selenium photocells (International Rectifier Type B2M)  
 R1, R2, R3—50,000-ohm subminiature potentiometers (Lafayette VC-36 or equivalent)  
 S1—Single-pole, three-position, miniature non-shorting wafer switch (Centralab 1461)  
 3—Wratten gelatin filters, 1 red, 1 green, 1 blue (Eastman Kodak #25A, #58, #47)  
 1—4" x 2 $\frac{1}{8}$ " x 1 $\frac{3}{8}$ " Minibox  
 Misc.—3 miniature knobs for  $\frac{1}{8}$ " shafts, 1 for  $\frac{1}{4}$ " shaft; 6-32 hardware, wire, etc.

film and cell surfaces—work with tweezers.

**Wiring and Mounting.** The wiring is straightforward, but be sure to observe the polarity of the photocells and ground the red *positive* leads. This is necessary because the red leads are shorted internally to the mounting brackets.

Mount each cell with a 6-32 screw, and cement a 1 $\frac{1}{8}$ " x 2" panel of clear plastic over the photocell window to protect them. The last step is to put drops of red, green and blue paint on R1, R2, and R3, respectively, and on switch S1 to show which cell is connected to the meter.

While not a high-precision instrument, the Color Matcher will give good, dependable service as long as the light source (sunlight is good) is uniform, the distance between meter and samples remains the same, and the samples tested have a similar texture.

