PARTS PROFILES

By DON LANCASTER

COMPONENTS OF THE MONTH

"PARTS PROFILES" IS INTENDED TO PROVIDE YOU WITH EX-
CITING INFORMATION ABOUT UNUSUAL OR LITTLE KNOWN
ELECTRONIC COMPONENTS AND DEVICES THAT ARE INEX-
PENSIVE, INTERESTING, AND USEFUL. THESE PRODUCTS WILL
USUALLY ENABLE YOU TO BUILD MORE INTERESTING PROJ-
ECTS AT LESS COST, IN LESS TIME, AND WITH IMPROVED
PERFORMANCE. ITEMS COVERED ARE AVAILABLE NATION-
ALLY OR FROM AT LEAST ONE RELIABLE SOURCE OF SUPPLY.

DECADE RESISTANCE BOXES

Here's a series of tiny decade resistance
boxes you can buy for under $4 apiece.
Dubbed "Claro-Decs" by Clarostat, the dec-
ade boxes are available in seven ranges:
0.1-0.9 ohm, 1-9 ohms, 10-90 ohms, 100-900
ohms, 1000-9000 ohms, 10,000-90,000 ohms,
and 100,000-900,000 ohms. Current ratings
are from 1 ma. to 1 ampere, depending on re-
sistance range. All Claro-Dec resistors are
wire-wound types with tolerances from 1%
to 5%, and power ratings of up to 2 watts.

Each decade box is encased in a two-piece
molded gray plastic housing which bears the
circuit schematic diagram, resistance multi-
pliers, and current rating. Solder lugs on
each unit provide external connections. Sev-
eral decade boxes can be ganged together by
means of a tongue-and-groove arrangement
to provide any desired resistance.

*Claro-Dec resistance boxes are made by
Clarostat Mfg. Co., Inc., Dover, N.H., and
are available from local parts distributors
for $3.95 each.*
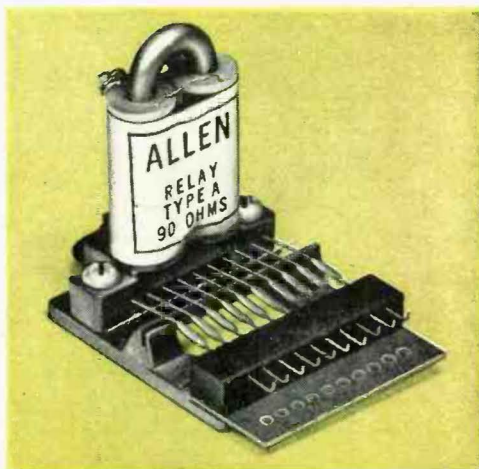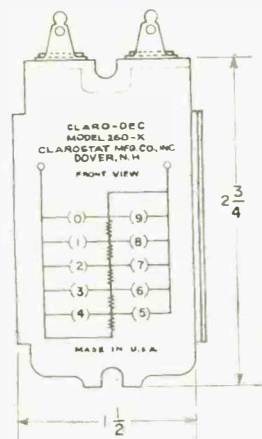
LOW-COST RELAYS FOR THE HOBBYIST

A 15-pole relay at less than 10 cents a
pole? Who ever heard of such a thing?
Allen Organ Company is now manufactur-
ing some—along with 10-pole relays. They
can be used in dozens of experimental cir-
cuits or devices ranging from electrome-
chanical computers, tic-tac-toe games, out-
door exhibits that spell out messages, to
latching and memory circuits and binary
demonstrators.

You can, for example, use a set of these
relays to light up a digital display that
can be anywhere from one inch to eight
feet tall, and at a cost below the price of a
single Nixie indicator or other readout tube.
The relays are single-throw types, and have
12-volt d.c. coils which dissipate 1.6 watts.
Contacts are rated at 0.5 ampere at up to
100 volts. Because the contacts are all in
line, the units are ideally suited for printed
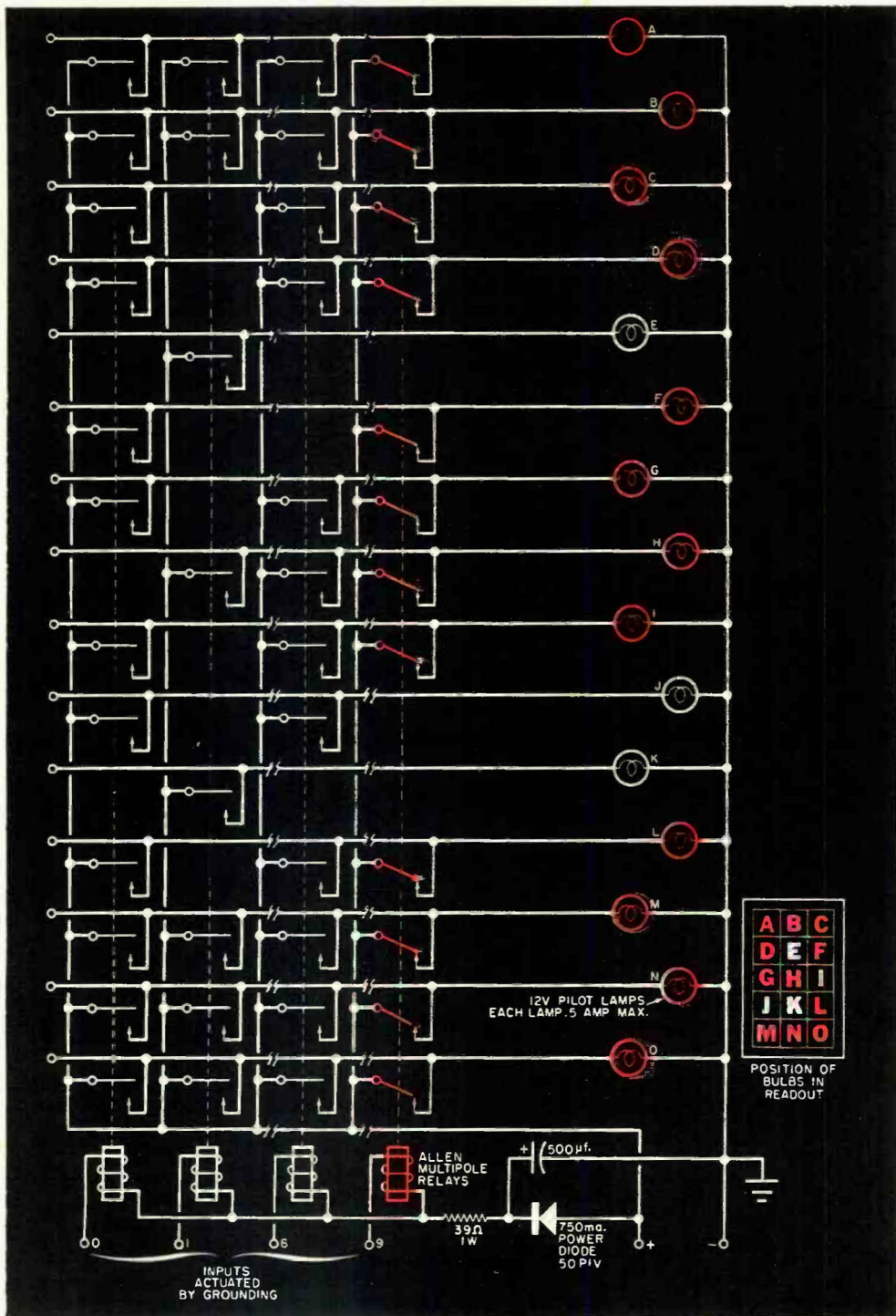circuit applications; all connections are

Fig. 1. This digital readout circuit has been programmed to display all numerals from 0 through 9. However, in order to simplify the circuit somewhat, some numerals have been intentionally omitted from the illustration. The relay for numeral 9 is assumed to be activated, and its circuit is shown in color.
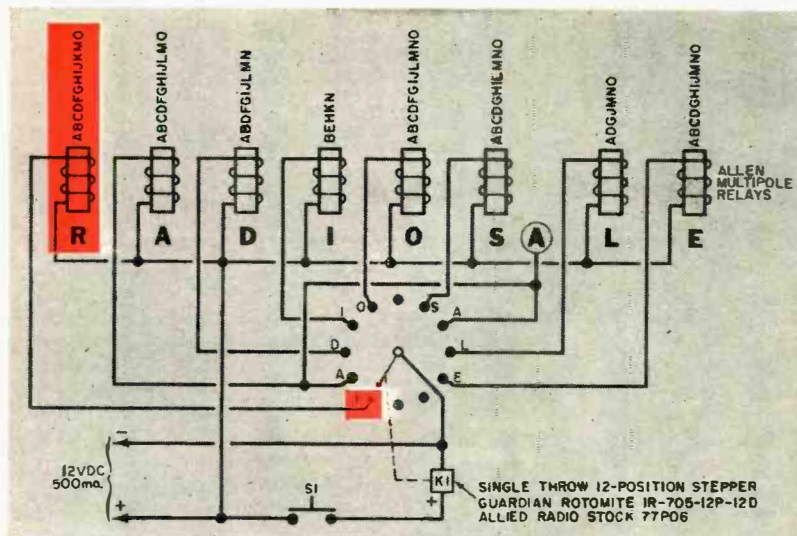
Fig. 2. The simple readout arrangement shown in Fig. 1 can be modified to spell out a sales pitch. The letters which appear above the relay coils indicate the lamps that will go on to spell out the large letters below the relays. When a message contains a letter which is repeated, only one relay is used to display that letter.

bonded in copper, and are made through eyelets in a double-sided printed circuit board.

Making a Digital Readout. Figure 1 shows the circuit of a typical readout device. The readout itself is made up of 15 boxes, each with a translucent front. The boxes are arranged five high by three wide in a matrix, and each box is equipped with a 12-volt lamp. If you want greater brightness than these lamps will give, you may connect as many lamps in parallel as necessary, as long as you do not exceed a total current drain of 0.5 ampere per box. Ordinary pilot lamps or automobile light bulbs can be employed. You can use a 12-volt automobile battery to power the whole display, but you'd be better off with a line-powered supply which you can build from a filament transformer, rectifier, and filter, and mount separately on a chassis.

Relay contacts are wired to light lamps needed for readout of all numerals from 0 to 9. For example, if the lamps are laid out as shown in Fig. 1, you can display the numeral 1 by merely connecting the display common busbar to one side of lamps A, B, E, H, K, M, N, and O. Unused relay contacts are, of course, not wired.

You can see, therefore, that the relay contacts are programmed to light only the lamps that are required for a particular display. For instance, if you want to display a "9", you merely ground the input terminal to relay 9, causing it to pick up, and thus light lamps A, B, C, D, F, G, H, I, L, M, N, and O. So, for any given display size, all you have to do is determine the number of bulbs you need for the necessary brightness, and away you go.

Getting Your Display to Read. You operate the readout by grounding the input to applicable relays. This can be done manually, or automatically by means of a saturating transistor switcher. The input switching circuit must be capable of handling 12 volts at 120 ma., easily accomplished by virtually any small transistor. Although the operating principles are quite basic to professional sign-makers, they are also applicable for use in digital readout circuits of voltmeters and frequency meters. Some score boards in large auditoriums operate on these principles.

If you want your readout to count, or spell out a sales pitch, then you'll have to include a stepping relay and a pulse source. Incidentally, keep in mind that your copy must not contain the letters M, N, Q, V, or W. (If these letters are to appear, the readout box must be rearranged.) Also, the number of contact positions on the stepper or selector switch must at least be equal to the total number of letters and spaces contained in the message. If you happen to have more switch positions than you have letters and spaces, you can add extra spaces at the end of your message to take up the slack.

To determine the number of multipole relays you need for any given message, count all the *different* letters that make up the copy. For instance, if there are three A's, you count just one. As to the number of poles each relay must have, that will depend on the particular letters involved. An "I", for example, would require fewer poles than an "R." If you use 15-pole relays, you'll have no problem, since a 15-pole

1300-1330 and 2300-2330 with a "Special for American Servicemen in South Vietnam." and at 1000-1030 and 1530-1600 with news bulletins and features for overseas listeners. "Vietnam Mailbag" is aired on Sundays at 1015-1030 and 1545-1600.

Vietnam (South)—*Vo Tuyen Vietnam.* Saigon, 9755 kc., is heard in Vietnamese from 0015.

Zambia—Lusaka, 3346 kc., has been noted with a normal "A" tuning signal at 0330-0340 and to 0342 with an IS which consists of the cry of the fish eagle. The program that follows is in native language and is typically African.

Clandestine—*R. Espana Independiente* has been heard on 7020 kc., dual to 6950 kc. at 2155-2202, and on 14.485, 15.160. and 17.696 kc. at 1300-1400.

R. Euzkadi noticed a particular listing in the Dec.. 1965. column. and commented as follows: "It is with pleasure that we have seen in your POPULAR ELECTRONICS issue the mention of our station. *Radio Euzkadi.* In effect. we transmit from our mobile station daily programs in Basque and Spanish at 2030 and 2200 on 13.230 and 11.260 kc. Please note the new schedule and times as well as frequencies. . . . *Radio Euzkadi* is the voice of the Basque underground fighters for freedom and democracy in our homeland. Euzkadi. Reports will be welcomed at P. O. Box 59. Poste Centrale, Paris 16, France." This comment was in the form of a letter signed by "The Editor" for *Euzkadi Irratia—Radio Euzkadi.* —30—

PARTS PROFILES
(*Continued from page 73*)

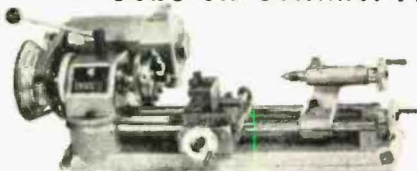relay can handle all letters and numerals as well.

Handling a Message. Assume that you want to announce a "RADIO SALE" on your readout. You would program the relay contacts as shown in Fig. 2, based on the lamp positions given in Fig. 1. With a stepping relay and an appropriate pulser, the message could be repeated indefinitely. The message requires an 11-pole stepper, but you would select a 12-pole unit, which is a stock item, and which will give you a longer pause between "RADIO" and "SALE." Also, observe that although there are nine letters in the message, only eight relays are needed since the letter "A" appears twice.

In operation, the stepper is pulsed momentarily every time a new letter is to come up. This may be done manually with a push button, or automatically with an automobile-type flasher, a pulser, or a synchronizing relay. If you use a pulser, you will get good effects with a pulse width of 100 milliseconds spaced one to three seconds apart. Of course, the best results will be obtained by trial.
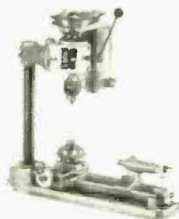
The Allen multipole relays are available from the manufacturer, Allen Organ Company, Components Division, Macungie, Pa., at $1.40 each for the 15-pole unit (10-pole unit, $1.30). There is a $20 minimum factory billing. A free data sheet on multicontact relays is available. —30—